VETERINARY MEDICINE

November, 1932

Forestry OCT 18 1932

Contents

Disinfection in Control of Bang's Disease....458
Case Reports from Atwood's Clinic....462
Milk and Communicable Diseases....472
Human Fevers Contracted from Animals....473
Functions of Ductless Glands....474
Production of Sows and Growth of Pigs....476
Swine Erysipelas Clinic in Illinois....477
Notes on Whipworm Elimination....480
Malignant Edema in a Horse....481
Studies on Commercial Dog Foods—Dry Foods....483
Nephritis in Dogs....489
Thoughts on Food Inspection....493
Torsion of the Uterus in the Cow....495
Vaginal Examination in the Cow....495
A Cause of Enzootic Sterility in Cows....495
Snuffles a Deficiency Disease of Rabbits....495
Contributions to the Knowledge of Fowl Leucemia....496
Snake Root and Rayless Goldenrod Poisonous....498

No. 11
VOL. XXVII

75 E. Wacker Drive
Chicago, U. S. A.

All of the drugs used in the compounding of Fort Dodge pharmaceutics are of USP or CP (Chemically pure) standard. For Fort Dodge makes no compromise with quality, countenances no use of "seconds" or elements of inferior grade in the products on which it places its seal of guaranty.

Such strict adherence to highest manufacturing standards assures Fort Dodge users of full value always in the Red Star pharmaceutical products they purchase.

QUALITY-RELIABILITY-SERVICE

FORT DODGE SERUM COMPANY
U. S. Veterinary License 112
Fort Dodge, Iowa

Veterinary Medicine

Registered in U. S. Patent Office

VOL. XXVII NOVEMBER, 1932 No. 11

Published Monthly by the Veterinary Magazine Corporation
75 East Wacker Drive, Chicago, Ill., U. S. A.
$4.00 a Year

Entered as second-class matter Nov. 8, 1920, at the post office at Chicago, Ill., under the Act of Mar. 3, 1879.
Entered as second-class matter under the title of American Journal of Veterinary Medicine, July 19, 1910, at Chicago, Illinois, under Act of March 3, 1879.

Copyrighted 1932, by Veterinary Magazine Corporation.
All matter appearing in this publication is covered by copyright, and no part of it may be reproduced without permission. Permission will be granted on request for the reproduction of anything in the columns of VETERINARY MEDICINE if the purpose of the reproduction is unobjectionable. Where there is any doubt as to the propriety of reproduction, the wishes of the author will be consulted.

D. M. Campbell, Editor A. T. Kinsley, Associate Editor

Guillot (Bull. Soc. Science Veter. de Lyon), in an autopsy on a female dog that died in a state of extreme cachexy, found a voluminous diverticulum of the gullet lodged between the lungs and containing a score of nematodes—*Spirura sanguinolenta.*

Bovine coccidiosis occurs most frequently in calves. Mature cattle are frequently carriers and are the usual source of infestation. The usual symptoms are unthriftiness and presence of blood and mucus in the bowel discharges. Pneumonia and nephritis may occur as complications of coccidiosis. The invading occidia are most frequently found in the mucosa of the large intestine.

Eleven cultures of spore-forming thermophilic bacteria grown in sterile skimmilk were fed to guinea pigs at the New York Agricultural Experiment Station at Geneva. The animals increased normally in weight, both during and after the feeding experiment. None of the species of bacteria tested produced any detectable toxic substances. The presence of thermophilic bacteria in market milk appears to be unimportant from the public health point of view, but large numbers of these or of any harmless bacteria in pasteurized milk are undesirable as the milk trade requires a product as free as possible from all bacteria.

The addition of alfalfa leaf to three different rations for rabbits produced greater gains in one ration only, and in that the cost per pound of gain was considerably increased by the use of alfalfa leaf.

Vitamine deficiency predisposes to infections. Experimental animals that are apparently in good physical condition but have been fed a ration deficient in either vitamine A or B have been found to succumb to infections artificially induced that normal animals successfully withstand.

Dalling, as a result of clinical observation and experimental research, believes that the silver fox must be added to the list of animals that are susceptible to the virus of canine distemper. He was able to carry out successful immunization by the same method used for immunizing dogs.

"Certain Chemical and Morphologic Phases of the Blood of Normal and Cholera-infected Swine" is the title of a thesis by E. A. Hewitt, published recently in the Iowa State College Journal of Science. The thesis comprises 107 printed pages and was presented to the Graduate Faculty of the University of Minnesota in partial fulfillment of the requirements of the degree of Doctor of Philosophy.

Cases of nicotine poisoning are increasing in frequency due to the fact that this alkaloid is being used quite extensively as an insecticide.

A blue whale at birth measures 23 feet in length, but on a diet of its mother's milk, the baby grows to 58 feet in seven months. —*Science.*

A representative of the lactic acid group of bacteria has been incriminated as an important factor in the decay of teeth. It is probable that certain predisposing influences such as deficient diet are also factors in the production of decay of teeth.—*Science.*

The occurrence of abscesses in the intermaxillary tissue of swine both vaccinated and unvaccinated is rather common. Little difficulty is experienced in relieving this condition as the affected animal usually makes a complete recovery after incising the lesion and thus providing drainage.

Although it is possible to maintain fertility by proper rotation of grains, grasses and legumes, i. e. by a system of cropping, it is more economical for the land owner to depend on livestock for the maintenance of soil fertility. The dairy cow is being used extensively in building up and replenishing depleted soils.

"Animals which show no symptoms either clinically and have no history of abortions, frequently give positive agglutination tests for *Br. abortus.* Injections of a vaccine into such animals have always insured successful gestation. Infection through the milk has never been observed."—*Bio. Abst.*

A newborn female foal that secreted approximately one quart of milk within a few hours after foaling was observed by Hallgren. The composition of this milk was practically the same as mare's milk. Milk from newborn female foals, "witches milk," no doubt results from abnormal stimulation of endocrine glands, particularly the suprenal capsule and hypophysis.—*Bio. Abst.*

Wheat is the greatest farm crop in politics and news. Yet, less than one-sixteenth of our national farm income is derived from this cereal. Poultry and poultry products constitute 9% and dairy products 20% of the farm income.

The crude fiber content of a feed should be regulated carefully. It has been found that swine will gain from 1 1/3 to 1½ pounds daily on a proper ration containing 3% of crude fiber but the gain will be only slightly in excess of one pound per day if the crude fiber is increased to 10%.

The Century of Progress Exposition that opens in Chicago June 1, 1933, will symbolize a new world in the making; a world that will have little in common with the world before the war. This exposition will be alive with the ferment of new ideas; teeming with the freshness of modern things—new notes in architecture; new techniques in industry.

The following table gives the average composition of milk from the different breeds of dairy cows:

Breed	Solids %	Fat %
Jersey	14.70	5.35
Guernsey	14.71	5.16
Devon	14.50	4.60
Shorthorn	13.38	4.05
Ayrshire	12.61	3.66
Holstein	11.85	3.42

Swine diseases other than cholera, especially enteric disorders, are relatively prevalent in various communities in the corn belt. Several centers of cholera have also been reported. There is an apparent variation in the enteric disorders that are now prevailing. Some years ago, *B. suipestifer* was apparently the primary causative factor, but recently pleomorphic streptococci are of common occurrence and are probably an important causative factor in some outbreaks of enteritis. Coccidia and other parasites must also be given consideration, at least as predisposing factors.

Dyer and associates of the United States Public Health Service have shown that two species of rat fleas—*Xenopsylla cheopis* and *Ceratopnyllus fasciatus*—are infectible with endemic typhus and incriminated them in the transmission of this infection from rat to rat and from rat to man.

As a result of observations made on 923 patients, Doctor Isaacs of the University of Michigan concludes that the effect of X-ray on the cells of cancer is not to kill them directly but to make them live their normal life more rapidly and die of senility at an early age. It is expected that this discovery will be of great importance in understanding the various kinds of cancer and other diseases of cell growth, such as leucemia, lymphoblastoma, and pernicious and other anemias.

Krauss, Erb and Washburn of the Ohio Agricultural Experiment Station, as a result of an elaborate trial, found that "Rats grew just as well on an exclusive pasteurized milk diet as on an exclusive raw milk diet, and as in the case of rats suffering from nutritional anemia, there was no significant difference in the ash content of the femurs or of the entire bodies of rats fed either kind of milk. It would seem pasteurization of milk from cows fed an ordinary ration does not appreciably affect the nutritive value of that milk."

Sawyer, Kitchen and Lloyd of the Rockefeller Foundation have announced means of producing immunity to yellow fever. Within the last four years, 32 of the scientists engaged in scientific yellow fever research have contracted the disease and five of them have died. The immunity is produced by inoculation with the yellow fever organism attenuated by passage through mice. The preventive is not available in large amounts, but it should be possible for the discoverers to protect those engaged in yellow fever research and explorers going into infested districts.

A new vaccine which promises to give protection against endemic typhus fever in the United States, has been developed by research workers in the U. S. Public Health Service.

Gerrit S. Miller, Jr., curator of the division of mammals at the U. S. National Museum, has called attention to the fact that certain monkeys and baboons show the same patterns of baldness that affect man, and that they become grey in the same way, first the beard, then the temples, etc., so no longer can grey hair be attributed to worry and baldness be blamed upon unventilated hats. Men share both conditions with other primates.

Scientists have found that workers in hot coal mines and steel plants can bear the high temperature better when they drink water to which salt has been added. Through perspiration the body loses not only water but salt. This is true of horses as well as men. A large part of the exhaustion in hot weather (heat stroke, sun stroke) is believed to be due to loss of salt, and consequent disturbance of the sodium-calcium balance in the blood.

For many years bacteriologists were of the opinion that bacteria were constant in form. Recently it has been apparently demonstrated conclusively that pleomorphism of bacteria is relatively common; in fact, there is an abundance of evidence that some well known bacteria, such as the tubercle and typhoid bacilli, when grown in a specified type of media will become ultramicroscopic and filterable. It has been further shown that there is also a chemomutation of bacteria which may explain the variability of immunization and immune therapy. Further, it has also been suggested that there may be an immunity center in the brain. Variability in pathogenicity, morphology and bacterio-chemistry is appearing on the horizon. Will specificity of pathogenic bacteria and of antigenic immune bodies fade away and finally disappear as the setting sun?—*Science.*

The Rôle of Disinfection in the Control of Bang's Disease

By ERNEST C. McCULLOCH, Madison, Wisconsin
Departments of Agricultural Bacteriology and Veterinary Science, University of Wisconsin

IT WOULD be unwise to advance the claim that Bang's disease is the only etiological factor of bovine abortion or of the sterility which so frequently follows the premature expulsion of the fetus. Likewise, it would be fallacious to suggest that any one factor is in all instances responsible for the transmission of a disease. Nevertheless it is of the greatest importance that the veterinarian, acting in the rôle of advising sanitarian, recognize and explain to the owner the probable ways in which disease germs may be transmitted from infected to well animals as well as to suggest the most practical procedures by which the spread of the disease may be controlled. The veterinarian is therefore faced with a complex and varying problem which differs with each farm and condition of husbandry.

Actual contact, especially at these times of greatest pathological activity when the infected animal is disseminating the maximum number of microorganisms which presumably are at their peak of virulence, is recognized as the period during which the etiological agent is transferred from infected to susceptible animals. No system of management can succeed that fails to protect animals from such gross and direct exposure.

Factors that are recognized as not being responsible for the transmission of the larger percentage of infection should not be ignored, inasmuch as the sum of such factors may be of great significance. As intelligent efforts are made to control an infection and the most important means of spread are eliminated, those avenues that are next in importance in turn become the most important. Finally, eradication may be defeated by some procedure or momentary neglect that would have had but slight significance where all susceptible animals were periodically exposed.

Drinking Water

The dissemination of disease through the medium of contaminated drinking water has long been recognized but has neither been the subject of extensive research nor general understanding. Obviously, the practices of allowing animals to drink from ponds in which they can wade is without defense from a sanitary point of view. Except in barns where individual drinking cups are provided, or on pasture where there is access to either a large stream of actively running water or to a large lake, water should be provided in troughs, and the troughs should be so constructed as to reduce the opportunities for contamination to a minimum. In some portions of the United States the only drinking water available during certain seasons is surface drainage water from the pasture itself. This water is impounded by damming a small draw or gully, thus creating a pond or reservoir. Obviously this surface water contains washings from the pasture, and the question arises as to whether the use of such drinking water will defeat any attempts to control disease. The danger from such water is more apparent than real and may easily be reduced to a minimum. Since these reservoirs are formed by damming a gully, it is obvious that the terrace must slope from the dammed end, and therefore the water can conveniently be piped to a sanitary trough. If the reservoir is now fenced to prevent gross and immediate contamination, the disinfecting forces of nature—time, dilution, sedimentation and biological activities will soon render the water innocuous. These forces are little appre-

ciated or understood, yet they undoubtedly are our most effective barrier against immediate and overwhelming infection, and surpass by many times the feeble efforts of man to destroy infection.

Time is the great disinfectant. When placed in an environment where multiplication is impossible, pathogenic bacteria die at a logarithmic rate and the bacterial population approaches extinction. Dilution is also a powerful factor in natural disinfection. If a discharge that contains pathogenic microorganisms is subject to sufficient dilution, a point will be reached where no animal can come into contact with a sufficient number of these organisms to induce infection. Such material has thus been rendered non-infectious by dilution alone.

Sedimentation removes bacteria from the water and they remain in the material on the bottom of the pond until other agencies have destroyed them. The struggle for existence is acute in a body of water. The protozoa and those bacteria which are adapted to a saprophytic life in water compete for the relatively small amount of available food. Pathogenic bacteria under such conditions would be unable to compete, so fall prey to those types of protozoa which subsist upon bacteria.

The destruction of microorganisms introduced immediately into the water trough is, as yet, an important but unsolved problem. Possibly the next advance in animal sanitation will be the chlorination of drinking water so that sufficient hypochlorous acid will be present to destroy any pathogenic organisms that might be accidentally introduced. In practice, pastures will not remain infected for appreciable periods. Competition with the organisms of the soil, drying and the ultra-violet light from the sun all tend to reduce the population of pathogenic microorganisms under such conditions. In winter, however, these factors operate very much more slowly and cold actually prolongs the life of most microorganisms. The rains of the spring partially compensate by increasing the dilution to which the discharges are subjected.

The barn and stables as inanimate carriers of infection may form a definite link in the transmission of disease germs from infected to susceptible individuals. This is especially apt to be the case where the maternity stalls are used for both the infected and the susceptible cattle, and where cleaning and disinfection may occasionally be neglected. In this work some difficulties have been experienced in disinfection with the recognized germicides. The salts of the heavier metals are either too toxic to make their use allowable, or are inactivated by protein or organic material. Many are prohibitive in cost.

The emulsions of cresols have attained great favor, although their objectionable and characteristic odor, which is readily absorbed by milk, distinctly limits their use. While less expensive than many other germicides, nevertheless the cost of disinfection by cresol emulsions is considerable. They do not mix well with "hard" waters, and their germicidal efficiency is not as great as many people have been led to believe.

The chlorine compounds, while efficient germicides and reasonable in price, are rapidly decomposed by the presence of large amounts of organic matter. They are not adapted to the disinfection of barns.

The Alkalies

The great germicidal efficiency of the alkalies against the gram-negative, non-sporulating bacteria has been recognized for years. Thalhimer and Palmer (1911) found that sodium hydroxide destroyed *B. typhosus* even in a dilution of 1:2500, and that against this organism it was 23 times as effective as phenol.[1] Two years later Cooper published a report showing that a 1:2500 solution of sodium hydroxide destroyed the typhoid organism in 45 minutes, a 1:1250 solution in 20 minutes, and a 1:625 solution in less than three minutes.[2] Halier (1915) reported that sodium hydroxide in concentrations from 0.5% to 1% killed anthrax spores in beef, sheep and goat hides.[3] Sierakowski and Milejkowska in 1925 reported that minute amounts of sodium hydroxide were sufficient to destroy the typhoid, paratyphoid and colon organisms.[4]

Yet, in spite of these published reports and the cheapness of the product, when pur-

chased as high grade lye, sodium hydroxide was not advocated as a barn disinfectant. In fact as late as 1932, Van Es, in his excellent book,[5] states:

"Sodium hydrate (NaOH) has, in applicable concentrations, but a slight germicidal action, however destructive it may be to all organic substances in the more concentrated solutions. Its chief value in disinfecting practice is limited to the preliminary cleaning process."

Olitsky and Boez in 1927 reported that sodium hydroxide was an efficient viricide and that the cheapness of this agent suggested its use as a field disinfectant.[6] Levine, Buchanan and Lease in 1927 published the first of a series of studies upon the germicidal strength of the alkalies[7] and the following year Meyers published on the effect of the hydroxyl ion concentration on the thermal death rate of the colon organism.[8] Olitsky, Traum and Schoening found that the virus of foot-and-mouth disease was inactivated in three minutes by from 0.25 to 0.5 per cent sodium hydrate, whereas the virus withstood 3% cresol for more than six hours.[9] Tilley and Schaffer in 1931 reported the results of tests of the germicidal efficiency of various alkalies in which they found that gram-negative organisms were quickly destroyed by low concentrations of sodium hydroxide.[10]

High-Grade Lye As a Barn Disinfectant

In view of the germicidal efficiency of sodium hydroxide reported by previous

Barger Macleod Gidley Patterson Malcolm Hell

J. V. LaCroix, Evanston, Ill. C. E. Bassler, Ainsworth, Ia. D. M. Campbell, Chicago A. R. Menary, Cedar Rapids

All Day Clinic Eastern Iowa Veterinary Association

More than 200 veterinarians from six states, including those shown above, attended this popular annual event at Mechanicsville, Ia.

workers, studies were made by the writer to determine its practical value as a barn disinfectant. At room temperature, a 1:800 dilution of high test lye* was found to be as effective against *Br. abortus* as a 1:100 solution of phenol, thus giving the lye a phenol coefficient of 8. The laboratory tests having proved satisfactory, barn tests simulating actual conditions were conducted. In an attempt to imitate the infected albuminous discharges from cattle, *Br. abortus* was grown in Reddish broth to which had been added 25% egg white. This was spread on selected areas of the barn floor before experimental disinfection was attempted. An unheated 1:150 solution of high test lye was used as the disinfectant. Samples were collected at intervals and the germicidal action of the alkali stopped by the action of unneutralized nutrient broth. It was found that the 1:150 dilution of lye, made by adding one 13-ounce can of high test lye to 15 gallons of water, almost instantly destroyed *Br. abortus* as well as all other gram-negative, non-sporulating rods. The cost of the disinfectant solution was one cent per gallon.

Effect of Heating

It is a generally accepted rule that the germicidal efficiency of all disinfectant solutions increases by two to four or even more times for each 10° C. increase in temperature. Lye solutions were found to provide a distinct exception to this rule,[11] there being no significant change in the germicidal efficiency of a lye solution between 2° C. and 25° C.

Freedom from Objectionable Odor

In addition to possessing a remarkable ability to destroy *Br. abortus,* the 1:150 lye was found to be an effective detergent, and materially assisted in the cleaning of the barn. In contrast to the cresol disinfectants, lye left no characteristic odor.

At first the possible toxicity of the lye solutions was the subject of concern. Further work revealed that the 1:150 dilution was not especially caustic to the skin or mucous membranes of man or animals. In fact, the writer has held this dilution in the oral cavity without injury.

Whitewash As a Germicide

It was found that whitewash, if freshly made from quick lime, is a very efficient germicide against *Br. abortus, E. coli,* and related microorganisms. The addition of cresol compounds to whitewash did not increase its germicidal efficiency. The common practice of adding cresol preparations to whitewash to insure disinfection therefore appears to be without foundation.

Whitewashes made from preparations other than quick-lime were without value as disinfectants. It is felt that high-grade lye and whitewash made from fresh lime offer a very satisfactory, odorless and inexpensive means of barn and stable disinfection.

* Lewis Lye furnished by the Pennsylvania Salt Mfg. Co. was used throughout these experiments.

References

[1]Thalhimer, William; and Palmer, Barton, 1911. A Comparison of the Bactericidal Action of Quinine with that of of some of the Commoner Disinfectants. *Jour. of Infec. Dis.,* 9:181.

[2]Cooper, E. A., 1912. On the Relations of Phenol and Meta-Cresol to Proteins. *Biochemical Jour.,* 6:362.

[3]Halier, E., 1915. Die Abtötung von Milzbrandsporen an Häuten and Fellen durch Natronlauge. *Arbeiten aus dem Kaiserlichen Gesundheitsamte,* 50:96.

[4]Sierakowski, S., and Milejkowska, F., 1924. Sur l'Action Bactericide des Concentrations en Ions Hydrogene pour les Differentes Especes Microbiennes. Compt. Rend. Soc. de Biol., Paris, 90:714. Abstracts of Bact., 8:270.

[5]Van Es, Leunis, 1932. The Principles of Animal Hygiene, New York, p. 281.

[6]Olitsky, P. K., and Boez, L., 1927. Studies on Physical and Chemical Properties of the Virus of Foot-and-Mouth Disease. *Jour. of Exp. Med.,* 45:673.

[7]Levine, M.; Buchanan, J. H.; and Lease, G., 1927. Effect of Concentration and Temperature on the Germicidal Efficiency of Sodium Hydroxide. *Iowa State College Jour. Sci.,* 1:379.

[8]Myers, R. P., 1928. The Effect of Hydroxyl-Ion Concentration on the Thermal Death Rate of Bacterium Coli. *Jour. of Bact.,* 15:341.

[9]Olitsky, Peter K.; Traum, Jacob; and Schoening, H. W., 1928. Report of the Foot-and-Mouth Disease Commission of the U. S. Dept. of Agr. Tech. Bul. 76, p. 57, U. S. Dept. of Agr.

[10]Tilley, F. W.; and Schaffer, J. M., 1931. Germicidal Efficiency of Sodium Hydroxide, Sodium Carbonate, and Trisodium Phosphate. *Jour. Agr. Res.,* 42:93.

[11]McCulloch, Ernest C., 1932. *Jour. of Bact.,* 23:40.

Random Case Reports from Atwood's Veterinary Clinic

By FRANK G. ATWOOD, New Haven, Connecticut

Canine Distemper

THE IRISH setter, fig. 1, may be taken as a typical severe case of this disease which is more prone to show variations than to run true to type. This dog when brought to the clinic for treatment presented the dejected appearance shown in the illustration. It had been sick for several days, the owner was a little uncertain as to just how long; had had three convulsions the preceding day and the excitement of bringing the animal to the clinic had caused another convulsion from which it was just recovering when it arrived. Note in the illustration that the animal was still drooling.

Fig. 1. Irish Setter with distemper. 100cc of anti-distemper serum was injected at the first dose

This setter was given 100cc of anti-canine distemper serum immediately, and as the owner wanted to treat the animal at home, he was given three-grain tablets of salol, one tablet to be given every eight hours.

The following day a call was made to see the dog and 50cc of the serum given. At this time, there was considerable irritation of the rectum and anus and the patient was straining a good deal. This was relieved by the application of Iodex ointment and a quantity left to be applied three times daily as long as required. The salol tablets were continued for a week, the animal fed lightly and in time it made a nice recovery.

What may be said to be the secret of success in the use of anti-canine distemper serum is to give a large dose early in the attack. This animal did not receive the serum until the disease was well developed and its prompt recovery under the circumstances may be said to be rather unusual. However, such cases are always worth a trial.

Where I can so arrange it, I like to have my clients obtain the anti-distemper serum from a drug store. This keeps the veterinarian's bill lower and does not arouse any suspicion in the owner's mind that I am making a profit on the serum and at the same time charging for my services.

Tumor Formation in an Old Dog

The English bull terrier shown, fig. 3, was brought to the clinic with a readily movable tumor in and beneath the skin of the left hind quarter, just below the external angle of the ilium. While the tumor did not appear to affect the general health of the dog, or materially in-

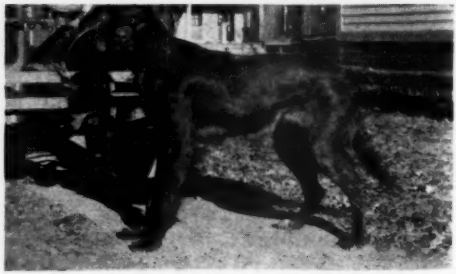


Fig. 2. Same animal shown in Fig. 1. The dog was practically recovered when this photograph was taken

convenience it, it was giving the owner a good deal of annoyance because from time to time it would break and discharge and as the animal was kept in the house, this was very objectionable.

The patient was given a rectal injection to empty the rectum, and following that an anesthetic by rectal injection. The tumor and surrounding area was cleaned, shaved, scrubbed with alcohol and then with a 1:1000 solution of mercury bichloride. The tumor was dissected out, fig. 4, and the wound closed with cat gut and silk worm gut in the usual way. A pack of cotton saturated with a 1:1000 bichloride solution was placed on the wound and held there by bandages which covered the entire quarter. This dressing was left in position for five days, when the animal removed it and pulled the wound wide open again.

Following this, it was treated as an open wound. In the beginning the healing was slow so it was irradiated once daily, using a violet ray lens under direct sunlight as shown in the illustration, fig. 5. Although this dog was 11 years old and showed his age materially, in fact was distinctly old as dogs go, he made a good recovery and his owner was delighted with the outcome of the operation and the treatment.

Fig. 3. Tumor on an eleven-year-old dog. Fig. 4. Removing the tumor under deep anesthesia. Fig. 5. Ultra-violet ray concentration from direct sunlight

Fig. 6. Rabies prophylaxis is a success and possesses many advantages far outweighing its cost

Rabies Prophylaxis

Some veterinarians have reported considerable trouble from abscesses, a sequel to the injection of anti-rabies vaccine in dogs. Any who have taken anti-rabies vaccine will agree that the injections are not the mildest thing one can take, and with the dog's well known tendency to develop abscesses from subcutaneous injections, it is perhaps not surprising that many abscesses have followed these injections for immunizing the animals against rabies.

Nevertheless, with care I believe that abscesses due to the injection of anti-rabies vaccine can be avoided in all except perhaps but very rare instances. The essential thing is to make the injection aseptically, to inject but a small quantity in a place and to massage it until the vac-

cine is thoroughly distributed in the tissues. The collie shown in the illustration, fig. 6, is receiving an injection of anti-rabies vaccine. Before making this injection, the syringe was sterilized by boiling, the vaccine had been kept in a refrigerator until I was ready to use it. The site of injection was washed thoroughly with alcohol and rubbed with a pledget of cotton soaked in a 1:1000 solution of mercury bichloride. The dose was injected in two equal parts, one on each side of the neck.

I have never had any bad results from the use of anti-rabies vaccine in this manner. Two dogs that had been bitten by an animal known to be rabid were given six injections each of regular veterinary rabies vaccine. The first injection was given on the day following the bite and the injection repeated on each of the five days succeeding. These dogs were treated more than a year ago and rabies has not developed in either of them.

The economic loss from rabies each year is considerable and amply justifies the eradication of this disease. The annual cost of rabies not only includes the loss of some thousands of domestic animals, but also the expense of administering 50,000 pasteur treatments to humans and occasional human lives. Since the public does not really want the disease eradicated, the wholesale anti-rabic treatment of dogs is the next best thing and should be encouraged at every opportunity.

Cesarean Section in a Boston Terrier

The Boston bull terrier matron shown in fig. 7 was brought to the clinic 64 days after having been bred to a Boston male. We gave metaphyllin (BYK = Guldenwerke, Berlin, Germany) before we gave the general anaesthetic, washed the field with alcohol and scrubbed it with a 1:1000 solution of mercury bichloride. The instruments were boiled and the hands of the operator cleaned in the same manner as the operative field.

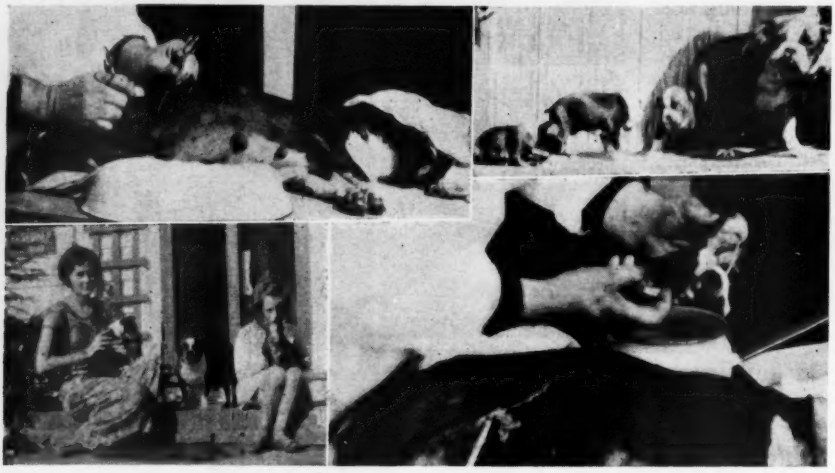


Fig. 7. Cesarean section in a Boston terrier. Upper left, the incision. Lower right, puppy's first breath. Upper right, matron and puppies a few weeks later. Lower left, the whole family

An incision was made under one of the old scars from a previous cesarean section. The operation was performed in the flank, fig. 7. We found six puppies, one with two extra hind legs, two dead and the three shown with the matron.

The incision through the muscles was closed with three cat-gut sutures which were left in place to be absorbed. The

skin wound was closed with silk sutures.

This matron made a good recovery. I have performed one cesarean operation on her since and she is still active and healthy. One of the pups shown with her in the illustration has herself produced two litters of pups born in the natural way.

Fig. 8. Left, Chow one year after being operated upon for Entropion. Center, same animal before being operated upon. Right, Boston terrier with injured eye

Entropion in the Chow

The turning in of the eye lids is, of course, common in the breeds that have small, deep set eyes, and perhaps most common of all in the Chow Chow. The condition is extremely painful and humane considerations if no others demand that it be relieved as promptly as practical. It is by no means a difficult operation, yet it is one in which the operator needs to exercise care and good judgment all the time. The essential thing is to remove just enough skin to bring the eyelids into a normal position and no more, since the more the lids are drawn back, the larger the eye appears and this, of course, is objectionable to the owner of a really fine Chow. Furthermore, if one produces the opposite condition, ectropion, it is more difficult to repair the mistake than to treat the original condition.

The Chow shown in the illustration, fig. 8, was brought to the clinic with entropion of both eyes. There was intense conjunctivitis from irritation of the eyeball by the hair. The cheeks were wet from constant discharge of tears and the animal was in pain and very uncomfortable.

A general anesthetic was given. The field of operation was cleaned, shaved and disinfected. A crescent-like incision was made around the outer canthus and extending about one-third the way onto each eye lid, upper and lower. A second crescent-shaped incision about one-fourth inch back of the first incision was made and the skin between the incisions excised. The edges were brought together and sutured with silk.

The illustration at the left in fig. 8 shows this Chow one year after the operation, at which time it was brought to the clinic to be immunized against rabies. The eyes were in perfect condition and there was no apparent scar from the operation.

Many cases of entropion can be cured by simply making incision laterally from the eye; that is extend the size of opening of eyelid by incision one inch long and keep this pulled open and clean. When it heals the contraction of the scar tissue relieves the entropion.

Following the entropion operation, we like to bandage the eyes after covering them with a pack saturated with boric

acid solution, for not more than 24 hours. Of course, it is essential to prevent the animal from scratching the eyes for a longer period than this. This is facilitated by keeping all four feet bandaged heavily.

Fractured Jaw in a Boston Bull

The animal shown on the left in fig. 8 was brought to the clinic with a compound fracture of the jaw and one eye badly injured. The case had been neglected for several days and was badly infected.

This dog was given a general anesthetic and the infected wound curreted carefully and several splinters of bone were removed. The fractured ends of the mandible were adjusted carefully and wired together. The case was treated as an open wound, the parts being irrigated twice daily with an antiseptic. The animal made a complete recovery except that a rather noticeable scar remained.

Deodorizing a Skunk

A nearly full grown, pet skunk was brought to the clinic with a request that the scent glands be removed. Thinking I would like to side step this operation, I explained how busy I was and gave the owner the names of all surrounding veterinarians, but it was no use. In a couple of days the skunk was back again.

The skunk was placed in a 5-gallon can. A towel on which we had poured two ounces of ether was carefully and quietly and gently deposited in the five-gallon can. In a few minutes the skunk was taken out of the can and to all appearances it would never require an operation. However, after efforts at resuscitation were gingerly applied for two or three minutes, it began to breathe again, but still was profoundly anesthetized.

We cleaned the parts around the anus, everted a portion of the rectum by squeezing between the thumb and forefinger and picked up the orifice in the rectal wall with forceps. A narrow eliptical incision about one-half inch long was made to include the orifice of the duct from the odor glands. This allowed the gland and its duct to come away readily. The incision in the rectal wall was closed with a single cat-gut suture. The opposite gland was removed in the same manner.

Fig. 9. Skunks make desirable pets —for some people

Illustrating site of operation for removing the odor glands of a skunk. A, Anus. B B, Site of the two incisions.—White

Perhaps it was not necessary, but the impulse to be absolutely safe induced us to give a few inhalations of ether before the operation was completed.

The operation is an easy one to perform. This skunk made a fine recovery and is now a splendid and much cherished pet. Rubber gloves were used for the operation and except for them and the forceps and the scalpel nothing was contaminated by the odor. These animals are said to be reluctant to release their odor when closely confined, where they must themselves inhale it. Perhaps this explains why no discharge of the odor glands occurred while it was in the can being anesthetized. The illustration, fig. 9, shows the animal immediately after it regained consciousness after the anesthetic.

A different technic, somewhat more difficult for the operator but avoiding injury to the rectal wall, and thus the possibility of peri-rectal abscesses, is shown in the other skunk illustration. In this operation the incision for the removal of the odor glands is made through the skin, laterally to the anus, on both sides.

We find the owners of these pets are willing to pay a good price for this operation. Success in avoiding the odor we think depends mainly on the manner in which the anesthetic is administered. Given as it was in this case, there is no danger of being scented, but the near fatality taught me the necessity for watching the anesthetizing a little closer.

Of course I was wrong in the first instance in endeavoring to sidestep this operation on the skunk. Such action but invites intruders into the veterinary field. One man doesn't want to bother with chickens and declines calls to treat them and soon there is a "poultry expert" in his community. Another doesn't like hogs and avoids calls to see them and soon the neighborhood handyman is the neighborhood "hog doctor." A third is busy with his practice and declines to devote a part of his time to the duties of milk inspector for his village and a lay milk inspector is appointed. So it goes, if we do not occupy our whole field others will; and usually their intrusion does not cease with occupying the void but extends and extends like a government bureau.

Blood Transfusion in the Horse

The illustration, fig. 10, shows a blood transfusion from a black mare to a grey gelding. The gelding was suffering from influenza. The black mare was healthy and strong and had not been worked for several weeks because she was balky, vicious, would break up any wagon to which she was hitched and showed many bad habits. She was regarded as being of practically no value and it decided to use her because if by chance she were injured or even killed, it would be a small loss. However, when we came to use her, she put up such a fight that she was given one and one-half ounces of chloral *per os* to quiet her.

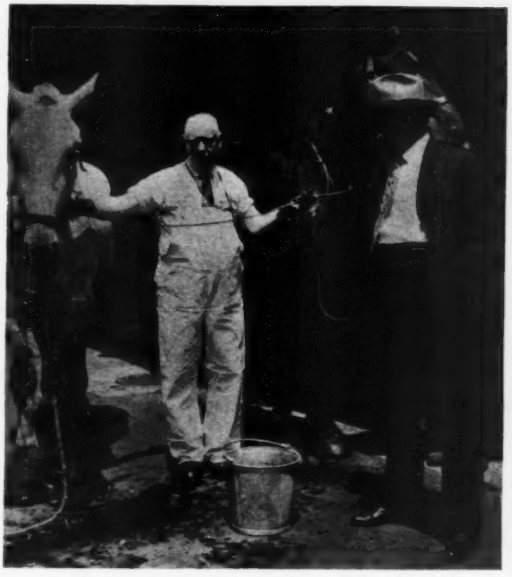


Fig. 10. Blood transfusion in the horse

We then cleaned up her neck and also

that of the gelding and raised the jugulars in both animals by placing a cord about the neck. Clean needles were used with a rubber tubing on each end, the tubes being connected by a glass indicator. We started the blood from the black animal and noted the time required to fill a two-ounce graduated. The tube was then connected to the needle in the grey animal and the cord removed from its neck. The connection was maintained long enough to permit six quarts of blood to flow from the black to the grey animal and the same procedure repeated on the following day and on the third day.

The black mare was greatly weakened by this abstraction of blood in three days. She was started to work while in this weakened condition and kept at it, and has given but little trouble since. The grey gelding made a good recovery. Of course, one can never be at all sure about so variable a disease as influenza, but we are of the opinion that the blood transfusion helped this animal materially. In any case, there is no doubt about it helping the black mare, although that was a totally unexpected outcome or rather one the possibility of which had not been taken into consideration.

Caponizing

Caponizing is a very easy operation to perform. With one assistant to catch and place the birds on the table, it takes but little time. In our opinion a veterinarian in general practice should plan to do this work. He can easily group it to have say a few thousand birds ready in each farming district and operate on them at clinics on any of the farms where they are ready for this work. Often caponizing may be combined with other veterinary work on the same farm. It is bad practice to pass up any veterinary operation, as the average stock owner expects his veterinarian to be able to do all work of this kind.

Our method is first to ask if the birds are off feed or are in any way not in a good healthy condition.

We operate on healthy birds only. Any that are not fit to operate upon, set aside for inspection. We use the bow method for holding the birds, or any other that is at hand and ready. Simply pull a few feathers off the region of the last rib and sponge this with weak antiseptic wash, make the incision between the last two ribs, insert caponizing spreader and use forceps for removing testicles. Remove the lower one first, then the upper one. See fig. 11.

If the incision is made properly, by pulling the skin and muscle back slightly, when the incision is made, the wound will close up when the legs are released.

Caponizing can be used to fill in time on farms when you are testing the

Fig. 11. Caponizing affords profitable employment for spare time

Fig. 12. An all too frequent sequel to "worming"

cows, fowls and swine for tuberculosis.

When one is on a farm for any sort of veterinary work, it is well to bring to the attention of the owners the desirability of having all work done that needs doing and not simply do one job and go on to another farm after another. Every farm has many operations waiting for a skilled and active veterinarian. Dentists call up and ask you about the care of your teeth and give you an appointment. There is, in my opinion, no reason why veterianarians should not plan their work and make such appointments. It will mean a profit for livestock owners and good business for the veterinarian.

Fig. 13. Left, inspection of hunting dogs. Right, inspection of Scotties

"Worming"

"Worming" dogs and other domestic animals is much abused by the laity. Frequently no anthelmintic is required and even where it is, many times the worm medicine given is worse than the worms. The illustration, fig. 12, shows an autopsy on a valuable English setter which was killed by a large dose of worm medicine. The intestines evidenced intense inflammation. This dog was poisoned just as certainly as if it had been done intentionally. The worming of dogs or other animals should not be allowed to degenerate into a routine procedure. The selection of the anthelmintic depends upon the kind of parasite it is proposed to remove and the size, age and condition of the host. Indiscriminate dosing of dogs with worm medicine constitutes cruelty to animals, just as certainly as do more obvious types of abuse. The practice deserves the attention of humane societies.

Among the laity, there are many who give an animal a big dose of worm medicine at the first appearance of anything wrong. Again and again I have had dogs brought to me in the early stages of distemper, but the thing of immediate concern was the damage done by worm medicine. Of course the prospects for recovery are poor indeed under such circumstances. Distemper and worm medicine poisoning combined are just too much, in most cases, for the dog and the veterinarian's skill.

Inspection of Dogs

The inspection of valuable domestic animals (fig. 13) is a duty the veterinarian is frequently called upon to perform and one that should never be regarded lightly. If an inspection is worth making, it is worth making right, and requires in addition to inquiry about the history of the animal, a careful physical examination, an examination of the blood, urine and feces, and last, but not of least importance, the keeping of an accurate record of just what was done and what was found. One can never tell when he may be called upon to justify his conclusions in giving a certificate of health to any animal or in refusing it.

Rabies Diagnosis

Perhaps in no other disease of the dog does the layman make an incorrect diagnosis in so large a percentage of cases as in those he suspects to be rabies, and no cases are so unwelcome to the veterinary hospital than are cases of rabies, like for example the Boston shown in fig. 14. The danger to the public, to the veterinarian himself and to other animals is such that he cannot afford to make any mistakes and this means he must be very careful in his examination and take plenty of time.

Fig. 14. Boston terrier in early stage of rabies

Fig. 15. Cattle are easily cast and restrained for operations

Of course, a veterinarian sees cases of rabies that he can unhesitatingly state at the first inspection are such, but this kind of cases is not the rule. Almost routinely, a veterinarian should keep cases that he suspects of being rabid under observation for some little period before making a definite diagnosis, and particularly is it important that the animal be kept under his control while it is under observation. The practitioner incurs not only a moral but a financial liability if he permits the owner to take a dog suspected of having rabies out of his charge unless he gives the most particular and definite directions for its control and warns the owner fully of its potential danger. It is not sufficient to tell the owner to "shut this animal up and we will watch it for a few days," because it is a matter of common knowledge, among the informed, that a rabid dog will frequently escape from an enclosure amply sufficient to restrain a normal dog. Nor is it sufficient to tell the owner "this dog may be rabid, be careful that he doesn't bite you." The owner must be warned of the characteristics peculiar to rabid dogs and explicitly warned against taking any chances whatsoever with him. The animal should also be properly screened from insects.

The carcasses of rabid animals should be cremated or otherwise disposed of so as to prevent the possibility of infection being carried to other animals or to man by insects or other agencies.

Restraint for Cattle

The largest bull may be restrained as simply as a toy dog. It is only necessary to handle him skillfully. The illustrations, figs. 15 and 16, show the manner in which the bovine may be cast and

held down with a single rope. Unless ample help is available, it is well before beginning to pull on the rope to tie the animal to a tree or post with a halter not more than three feet long. Holding the animal down is rendered easier with the halter tied to the post at the surface of the ground. After the animal is thrown, the anesthetic, local or general, may be given. The ten-gallon sky piece is not indispensable to success in restraining cattle for veterinary operations, but it appeared in this case to be indispensable to the owner's sense of the fitness of things as soon as he saw the camera. Oh, well, a far more distinguished Yankee not so long since put on not only a ten-gallon Stetson but chaps also for the motion picture camera.

Injury to a Cow's Foot

A good many small boys and some that are not so small are prone to display their patriotism on July 4th by throwing lighted fire crackers among domestic animals. The practice is a dangerous one and we have to record on Independence Day each year no little injury to animals and other property from runaways, wire cuts, burns, broken fences and vehicles, etc.

The cow shown in the illustration at the right in fig. 16 is a victim of some small boy's exuberant patriotism. Startled by the explosion of a fire cracker, she charged for a man mowing grass nearby. He charged too, but in the opposite direction, leaving the scythe from which the animal received a long and deep incision on the left hind leg. Several blood vessels were severed. The leg was corded and we were called. The animal stood quietly while we picked up and ligated the larger blood vessels, but when it came to suturing the wound, she would have none of it, and it was necessary to control her by the means of a lasso and half hitch thrown around her body as described in the foregoing case. The wound was sutured and the entire leg, from the foot to well above the injury, was swathed in a pack saturated with a 1:1000 solution of mercury bichloride. This pack was moistened with the same solution twice daily and was not removed for ten days, at which time the parts were healed in fine shape. There was no elevation of temperature at any time while the animal was under treatment.

In placing a similar dressing on animals, it pays well to take lots of pains with the first dressing, to remove carefully all devitalized tissue (Debridement). It is seldom necessary, except in old infected wounds, to dress such cases daily. In the ordinary fresh wound where it is properly prepared and properly dressed, the dressing may remain without change as long as this type of protection is needed.

Fig. 16. Left, restraint in the ox. Right, arresting hemorrhage following severe cut on a scythe

Milk and Communicable Diseases

By JOHN F. MILLER, Albany, New York
Bureau of Milk Sanitation, State Department of Health

IN this state milk sold at retail must be produced and handled in accordance with the provisions of Chapter III of the Sanitary Code. These regulations were designed to prevent the spread of communicable diseases through milk and to improve its quality.

In those municipalities where milk regulations are enforced properly it has been shown repeatedly that the consumption of milk has increased as the product is made safe and the quality improved.

For the promotion of health, both in children and adults, there is no better single food than milk. But care must be taken that it be of good quality and so produced and handled as to be bacteriologically safe.

No single food contains so many elements necessary for health and growth. Milk is the chief source of calcium for bone growth; it supplies the best form of protein from which to build body tissue; it supplies fat and sugar for energy, and it furnishes in liberal amounts the vitamins A, B and G which are necessary for growth and for building up a resistance against disease.

Milk provides a good medium for the multiplication of many varieties of bacteria. The ordinary bacteria of the air and soil are most commonly found in it, but those from diseased animals and humans occasionally gain access and may cause specific diseases. They all multiply in milk with the exception of the bacillus of tuberculosis. This explains why a very slight infection is serious and why diluting infected milk with pure milk does not materially lessen the danger after it has stood a while. It also explains why milk which is merely dirty or has a high bacteria count cannot cause these specific infectious diseases unless the specific germ is present also. Disease germs are not likely to be present in milk unless it is drawn from a diseased cow or unless there is an infected human being handling the milk or milk utensils or polluting the water supply.

The diseases which may be contracted through milk are either of animal origin or of human origin.

Among the diseases of animal origin thus contracted are tuberculosis, malta fever or undulant fever. In addition to these specific infections milk drawn from an inflamed udder may be the cause of acute vomiting and diarrhea a few hours after drinking it.

The principal diseases of human origin carried by milk are typhoid fever, paratyphoid fever, scarlet fever, diphtheria, septic sore throat and possibly others.

Records of the New York State Department of Health for the 14-year period, 1917-1931, inclusive, show that, exclusive of New York City, there were in this state 100 milk-borne outbreaks with 3,759 cases of communicable diseases reported. Most of these outbreaks occurred in small communities, and with two exceptions were due to raw milk. The infection occurred at the farm in about 80 per cent of these outbreaks. Carriers on the farm apparently were responsible for 49 of the 65 typhoid fever outbreaks. Udder infections were responsible for eight outbreaks of gastro-enteritis and apparently were the cause of five outbreaks of septic sore throat.

The most vital thing in connection with milk is its safety. Milk properly pasteurized and properly handled is safe milk.

People living on farms and in the smaller villages who cannot obtain pasteurized milk from dealers may pasteurize in the home by the following methods:

Bring milk to a boil quickly and cool it in a closed container. If anyone objects to the resulting cooked taste, the following method may be used:

The milk for one day's supply can be put in the top of a double boiler and heated un-

* Excerpts from a radio broadcast, July 30, 1932.

til the thermometer registers 143 deg. F. The milk should be kept at this temperature for 30 minutes and then rapidly cooled to 50 deg. F. and kept cool until used.

It should be noted that while pasteurized milk protects the consumer against milk-borne diseases, it does not eliminate or eradicate the disease. Other measures must be applied to accomplish this end. The infected animals must be detected and either quarantined or removed from the herd.

The dairyman who expects maximum profits from his dairy cannot afford to provide less than the public should demand—milk that is safe, clean and of good flavor.

HUMAN FEVERS CONTRACTED FROM ANIMALS

Five new diseases, each simulating typhoid and malarial fevers in certain instances, are coming to be generally accepted. If any one contends they are not new there is still no real disagreement, for the difference is nothing more than relates to the word "new." When one person speaks of a new disease he means one that has not previously existed, while another means one that has not previously been known, leaving to one side all discussion of why it was not known.

The five new diseases are: Rat bite fever, tularemia, undulant fever, endemic typhus, and the eastern type of Rocky mountain spotted fever.

Rat bite fever cannot edge far into the group for two reasons. First, that there was such a disease has been known for a long time, though not many have seen it, and of those, not many have recognized it. Second, it is usually quite unlike typhoid. The three cases I have recognized could easily have been mistaken for malaria but not for typhoid. Tularemia, now that we know it, should not be called typhoid. Probably the cases of the other three are due to pass for typhoid or malaria for several years yet.

There is now so little typhoid and year by year increasing sections of the country are cleared of malaria, therefore it is and will continue to be that a very considerable proportion of cases that are treated for typhoid or malaria are really something else. A man who has been uncomfortably full of quinine for a month or more is not particularly happy when he learns that he had some other disease, and that he need not have taken the quinine that has produced his discomfort.

It is worth while knowing that all of these new diseases man contracts from the lower animals in one way or another. In some cases it is from the animal directly through handling it, being bitten by it, or from eating the meat or the milk. Sometimes it is through an intermediary such as a flea, tick, mite, or louse.

One of these diseases concerning which we are learning much is typhus fever. Twenty years ago we thought of American typhus as being a Mexican disease. We now know that at least one variety of typhus, and maybe two, is widely scattered over the country, and a great many who are being treated for typhoid or for malaria are sick with a fairly mild form of typhus.

It is reasonably well established that this form of typhus is carried from rats. This pestiferous animal is the reservoir and from it alone can man catch it. It appears to be carried to man by rat fleas, though it is possible that it may be spread to man by rat mites and rat lice also. As a precaution against this fever it is a waste of money to purify water supplies, to pasteurize milk, and to fight mosquitoes. Nothing promises results except to war on rats.

Control of the other four new diseases is also a question of control of animals and insects.—W. A. Evans in *The Chicago Tribune*.

The live culture vaccine inoculated subcutaneously has given good results in Bang infected herds in heavily infected regions in Finland, according to Huhtala. Notification of Bang's disease is compulsory in Finland as is also pasteurization of milk from infected cattle.—*Bio. Abst.*

Some Ductless Glands

By J. H. BURT, Manhattan, Kansas
Professor of Anatomy and Physiology, Veterinary Division, Kansas State College

PHYSIOLOGY has always been an interesting study. Living matter is always a source of interest to us. We want to know what influences are brought to bear to make things as they are and what they are likely to become as time goes on. Physiology deals with the normal functioning of living matter. When the functions of the body are carried on in a proper manner, we speak of the body as being in a normal, or healthy condition. Deviations from the normal functioning results in a diseased, or abnormal, condition. Obviously, there must be "some thing" or "things" that will regulate and co-ordinate the different functions of the body so that each part does its work at the right time and in the right amount, and the functions of the body are carried on without "hitch" or "letup."

Formerly the nervous system was considered as the part of prime importance in directing the work that each organ or cell should do, and to bring one part in relation with other dependent parts. Believing the nervous system to occupy such an important place in the body, it is easily understood why it was called the "master tissue." But recently it has been discovered that another set of organs claim an important part in directing the various functions of the body. The existence of certain organs has been known for hundreds of years.

The old anatomists saw that some glands had ducts or tubes to take away the secretion. They were able to collect this secretion and learn something of its uses. On the other hand, there were some little organs that did not have a duct to take away the secretion of the gland. Not being able to get any secretion from these bodies they were unable to learn their true use and, believing that all parts of the body had a use, they ascribed certain functions or uses to these bodies—functions which we know today to be erroneous. They did not know that the secretion of these glands was carried to all parts of the body by the blood stream.

Thirty years or so ago the study of the ductless glands was a field of practically virgin soil. If we should look in a textbook of Physiology of that day, we would find the subject disposed of in very few words. Since then, much has been learned and the work that has been done on these hitherto little known glands is enormous. Each year thousands of hours of laboratory and clinical work are done and thousands of papers are written upon the subject. Unfortunately, the great bulk of this work is quite barren of any real or lasting value. We read from time to time, in the daily papers, in semi-scientific publications, and in advertising literature of some of the drug houses, sensational and glowing accounts of the activity of these glands.

The secretions of the ductless glands are not specific; that is, the secretion or extract obtained from one species will produce the same results when introduced into another species. This characteristic is of great value in investigating the uses of certain extracts. If removal of one or another of the glands in the lower animal is followed by certain symptoms, we are justified in expecting similar symptoms in man if the corresponding gland is deficient or lacking. On the other hand, if certain symptoms follow the introduction of the extract into a rat, rabbit, cat, or other animal, we are reasonably assured that man will show similar symptoms if that particular gland is over active.

The active product of the gland may be administered in a variety of ways. At first the sheep's thyroid gland was given raw to overcome conditions caused by a deficiency of the thyroid in man. Now the same material may be given in the dry form in powder, tablet, or other form.

The material obtained from most of the

glands is quite stable and will last for a long time, possibly for years, without deteriorating. Adrenalin that was kept under ordinary conditions for three or more years apparently was just as active and produced the same results as when fresh.

The amount of secretion needed to produce results is very minute; 1/1000 of a grain of adrenalin will markedly increase the blood pressure of a dog. Three and one-half grains of thyroxin from the thyroid gland is sufficient to keep the body in normal health for a year, yet, lacking this, the individual becomes an imbecile.

Some ductless glands have more than one internal secretion, and an abnormal condition may be attended by a variety of symptoms. Again there is an interdependence between some of the glands so that a combination of two or more will produce symptoms totally different from those produced by the individual gland.

Two glands that were among the first to be recognized as the cause of certain conditions and their functions to be investigated were the adrenals, and the pituitary body or hypophysis.

The adrenals are two little bodies; each is super-imposed on the kidney on its respective side. The gland consists of two parts —the cortex, or outer part, and the medulla, or inner part. Each part furnishes secretion which has different functions. The medulla secretes a substance that is known under the trade name of adrenalin or epinephrin. Adrenalin has a very powerful effect upon blood pressure by constricting some arterioles, especially those of the skin and digestive system. One one-thousandth of a grain injected into the blood stream of a dog will cause a well-marked rise in blood pressure in a few seconds.

1. The flames of anger or emotion are fed by the secretion of the adrenals. A person with good adrenals is vigorous, active, and powerful. One with a poor pair is weak and enjoys resting.

Humans, as well as animals, are stronger when they are frightened or angry. The increase in strength is due to an additional outpouring of the secretion of the adrenals. Adrenalin is poured out under the goading of both fear and anger. It causes the fat and sugar to be oxidized, or burnt, to produce fuel for the muscles. It is easy, therefore, to see why anger and ill temper cause one to lose weight. The opposite is also true. Good temper makes no drain upon the fatty tissues. To a degree then (as far as the adrenals are concerned) people are not good natured because they are fat, but are fat because they are good natured.

If an emotion, resulting in the outpouring of the adrenalin secretion, includes adrenalin alone without associate adequate response by the cortex of the adrenal and of the other glands, the emotion is one of fear or terror. If with the outpouring of adrenalin there is an adequate outpouring from the adrenal cortex, the emotion tends to be more that of anger. If with this adrenalin outpouring there is joined an adequate response by the posterior pituitary, as is the case when maternal instinct or sex instinct is aroused, it enhances the action of the adrenals. If the anterior pituitary responds to an emotion there is the added element of strength, but what is more important the presence of anterior pituitary outpouring adds the element of judgment and self possession.

2. Thomas Addison (1793-1860), an English physician, discovered that an abnormal condition of the cortical part of the adrenals was responsible for a disease, one well-marked symptom of which is manifested by a bronzing, or darkening of the skin. Within the past year mention has been made several times about this rare disease and the use of cortin, a secretion of the cortex, used in combatting it.

3. The cortex also has some influence on the sex organs. Deficient secretion will cause the male to have characteristics resembling the female. Tumors affecting the cortex will cause the adult female to have some male characteristics, and accounts for the masculine voice and the growth of hair on the face.

The pituitary body is located at the base of the brain. It consists of a posterior lobe,

and anterior lobe, and an intermediate part. Extracts obtained from the posterior lobe exerts its influence upon the involuntary muscles. It causes a rise in blood pressure, but its action is slower than adrenalin in the beginning and its effects are much more lasting.

The anterior lobe influences growth, secretion, and metabolism. Inactivity of this lobe will result in stunted growth and dwarfism. Such little people are often seen in circuses. The defect is principally physical, and not mental, as usually they are fairly intelligent, if the other glands are normal.

Enlargement with an excessive secretion of the gland results in overgrowth, or giantism, and that explains the picture of a man that appeared in the "Believe it or not" section of a Sunday issue of a city daily, with this statement, "Jan Van Albert, of Holland, 9 feet 3½ inches tall," and also this statement, "The Giant of Harlem is Dead. Harlem has lost its biggest citizen in the death of James Finch, negro sandwich man. He was 7 feet 6 inches tall and weighed 678 pounds. Finch was 28 years old, and earned $12.50 a day parading before a shoe store with his sandwich."

Insufficient secretion may also interfere with proper oxidation of the food, and there is a tendency for the individual to become fat. To movie fans, the fat boy in the "gang" of juvenile actors is a familiar figure, but let us hope that he will not, in a few years, be unfortunate enough to merit a similar description as the following which appeared this year in a well-known periodical.

1. Citizens who puff their chests out with pride whenever our country possesses the biggest or the tallest this or that, may now swell even larger—for we have the fattest man.

Harry R.—Not only the fattest in the world but the fattest that ever lived, so far as we know. He lives in Los Angeles (check up one for California) and weighs 787 pounds. Daniel Lambert, who lived in England and died in 1809, weighed only 739 pounds, and "Miss Ima Whale," of an internationally known circus, probably the world's fattest woman, tips the scales at 630 pounds.

It is very probable that the foregoing description applies to persons suffering from a defective pituitary gland.

The question may be asked, "What can be done to avoid this condition?" If this enormous size is due to a deficiency in amount secreted, it is reasonable to think that the administration of the extract would combat the trouble. About a year ago a certain Dr. Adolphe Edward Roome of California was granted a court order permitting him to compel his son, aged 14 years, 6 feet tall, and weighing 235 pounds, to submit to such treatment.—K. S. C. Extension Service.

PRODUCTION OF SOWS AND GROWTH OF PIGS

An interesting experiment to determine the production of sows and development of suckling pigs was conducted in Sweden under the supervision of Olofson and Larson. The report was based on the findings in 200 sows and 200 litters of white pigs for a period of six to eight weeks. It was found that the average daily consumption of feed per sow was: 11 pounds of concentrates, 12½ pounds of skim milk, and 6½ pounds of carrots; the sows lost 32 pounds during the suckling period; the average daily milk yield from the second to the eight week per sow was 10 pounds; the colostrum contained 15.8% protein and 2.7% fat; normal milk contained 5.7% protein and 3.4% fat; the pigs averaged 2.7 pounds at birth and 28.8 pounds at eight weeks of age; the pigs began to eat additional food when three to four weeks of age, but at eight weeks the sow was still supplying 40% of the total nutrient requirements of the pigs.

Comment: Of the many interesting suggestions in the findings of this experiment, two factors are outstanding: First, the composition of colostrum and the quantity of milk and, second, the relative amount of milk consumed by eight week old pigs.—*Exp. Sta. Rec.*, Vol. 67.

Swine Erysipelas Clinic

A SWINE erysipelas clinic, attended by more than 100 veterinarians, was held at the Diagnostic Laboratories of the State Department of Agriculture at the University of Illinois, September 14th. The clinic material consisted of ten June pigs from a herd in Woodward County, the first outbreak in Illinois in which a clinical diagnosis of swine erysipelas was confirmed by the Department of Agriculture Diagnostic Laboratories.

Swine Erysipelas Clinic, University of Illinois, September 14, 1932

Herd History

The first occurrence of the present ailment was noted in this herd a year ago. Among about 100 pigs farrowed in June, 1931, a few developed lameness at about four months of age, and presented enlargements on the legs principally at the joints. These pigs did not do well after the development of the lameness, but no deaths in the herd were attributed to this ailment. The animals, however, remained permanently unthrifty.

Unaffected gilts from the 1931 litters were retained for breeding and bred to farrow in June, 1932. About 90 pigs were farrowed this year and when they were approximately two weeks of age, several of the sows suffered an attack of stiffness and slight lameness, but there was no enlargement of the joints of the legs. Soon after this, enlargements began to develop in the young pigs, principally at the carpal and tarsal articulations and just below or above these articulations at the epiphyses of the long bones of the legs. Probably half the pigs remained entirely unaffected. About 20 were markedly affected and nearly as many more slightly affected. At the present time there are 70 pigs in the herd.

Following the diagnosis of swine erysipelas in this herd, these 70 pigs, except for the 10 saved for the clinic, were given anti-erysipelas serum, 25cc each. Subsequent to that there has been no extension of the disease in the herd and the attending veterinarian is of the opinion that there has been some improvement in the slightly affected cases but no change in the markedly affected animals, such as were shown at the clinic.

Symptoms and Lesions

Ten of the markedly affected pigs were presented at the clinic. The most outstanding symptom was unthriftiness. They were in poor flesh. Although they had been fed liberally on soy bean meal, tankage, alfalfa meal and all the corn they would eat, they were obviously stunted and a total loss so far as prospects of producing a profit were concerned.

The pigs were more restless than normal and it was stated that when they were aroused in the morning they squealed somewhat, evidencing some pain on first moving out of the nest in which they had slept. The elbow, knee, carpal and tarsal joints were enlarged to a greater or less degree and in some cases there was an even greater enlargement of the epiphyses of the long bones. There was no apparent distortion of the bones of the head or face or of the body. The enlargements were only slightly or not at all painful on palpation. The ears of most of the animals were somewhat thickened, showed numerous inflamed areas, and some open ulcers or sores. Such lesions,

however, are so common on the ears in pigs of this type that there is considerable doubt as to whether they had any connection with the cause of the joint lesions.

On autopsy, the enlargements of the legs exhibited little gross pathology other than the enlargement, reddened bone marrow and the cancellated portion of the bone thrown into ridges. There was some hyperemic inflammatory exudate, but no pus. In one or two instances, what might have been early stages of bony ankylosis of the articulation was perceptible.

Other than in the affected areas, the carcasses were normal. There were no vegetative growths on the heart valves and no lesions of the lymphatics except that in one animal, percrural lymphatic glands showed inflammatory changes. This may or may not have had some connection with the inflammation of the bones. The carcasses were slightly anemic and contained very little fat. It must be admitted these were far from typical cases of erysipelas.

Discussion

Erysipelas has long been an important disease of swine in Europe. It is extremely widespread, occurring all over the continent. In some districts it is responsible for greater loss than any other disease of this animal. Hutyra & Marek describe it as occurring in two forms, an acute septicemic generalized disease and a chronic affection of the skin. In this country it occurs in four fairly distinct forms — septicemic, acute, subacute and chronic. The chronic type is further divided into a cutaneous form in which the lesions occur principally in the skin and an articular form in which the joints of the legs are the principal site of the pathological changes.

Swine erysipelas, even of the acute type, has probably occurred in this country for more than 30 years, but it was not recognized, as such—probably usually diagnosed hog cholera. About 12 years ago an urticaria of swine, diamond skin disease, was demonstrated by Creech to be due to the *B. erysipelatis suis* (*Bac. rhusiopathae suis,* Kitt). It was only about 10 years ago that the acute and subacute types were recognized. Since that time it has been encountered in the Missouri Valley territory with ever increasing frequency from year to year. During the past summer it occasioned severe losses in contiguous parts of South Dakota, Iowa and Nebraska. As yet it has not occasioned losses in this country extensive enough to classify it as an important disease of swine, but its steadily increasing prevalence, and particularly its history in Europe, justifies its classification as a disease of great potential danger to the swine industry and one about which practitioners should be thoroughly informed.

The septicemic type of swine erysipelas occurs and is becoming relatively common in the United States. In this type of the disease, death occurs within a few hours of the appearance of the first symptoms. Unless death is very sudden, there is great prostration and extensive hemorrhage into the lungs, lymphatic glands, spleen and intestinal wall and an acute nephritis. The animals commonly die within 12 hours of the appearance of the first symptoms or often in a considerably shorter period. The most acute attacks develop fewest lesions and not infrequently none are found. In such cases of course the history and laboratory finding must be relied upon to establish a diagnosis.

Chronic type.—This is the form most often seen in the United States. It is a slow-going disease that offers considerable difficulty in clinical diagnosis. The symptoms and lesions often vary in different herds, but always unthriftiness is one of the symptoms. There may be little other than this, except a dermatitis which may be so mild that only a portion of the tail or perhaps the tips of the ears slough. Again, it may be so severe that large patches of skin slough from various parts of the body. Or, it may exist in any degree between these two extremes. Diamond-shaped inflamed areas on the

skin are rare, but they are of considerable diagnostic value when found. Or, again, as in the cases shown at the clinic, there may be no dermatitis, but a more or less marked lameness with enlargement of the joints.

On autopsy, the enlarged portions of the joints may, as in the cases referred to above, show simple inflammatory changes or there may be an increased quantity of a flaky synovial fluid. Vegetative growths on the heart valves (*endocarditis verrucosa*) occurs in a majority of cases. The finding of this lesion is of marked diagnostic value.

Subacute type.—In the subacute type there is an intensity of the symptoms shown in the chronic type. Frequently both an enlargemnt of the joints and a dermatitis are present. The temperature may be elevated; red or reddish purple splotches may occur on the belly. The unthriftiness is more marked. The appetite is apt to be depraved and the animal prefers filth, rotten straw, manure, etc., to the best feed that can be supplied, and to drink barnyard water. The mortality is not high, but loss of weight, stunting and permanent unthriftiness ensue, and occasion much loss.

On autopsy, hemorrhagic areas may be found in various tissues and particularly in the intestinal wall. The prescapular, presternal, axillary, precrural, inguinal and other lymph glands may be enlarged. Vegetative growths occur on the heart valves.

Acute type.—The acute type of swine erysipelas is characterized by sudden onset, high temperature, marked prostration and almost 100% mortality. There is not likely to be any enlargement of the joints and probably no lameness. The animals are markedly sick and inclined to lie in the bed. A severe diarrhea often occurs. The feces may be stained with blood. Occasionally there is bloody urine. When aroused, the animals are apt to jump up suddenly and have convulsions. The temperature varies from 104° F. to 108° F. There is little or no appetite and such as there is is perverted. fected and they have the mild, chronic The most characteristic symptom, however, and one that may be said to be pathognomonic, is frequent, almost continuous, vomiting of a severity not observable in any other disease of swine. On arousing a herd, probably one-half of these affected will begin vomiting at once.

On postmortem examination, most lymph nodes are found enlarged and full of serum or even engorged with dark-colored blood. There may be hemorrhage in the muscular coat of the intestine, the mucous surfaces of the bladder, also into the heart muscles, pericardial sac, skeletal muscles and fatty tissues. There are purplish splotches on the skin, particularly on the under side of the abdomen. A significant lesion of the acute type is an intense gastritis, a so-called "paint brush" lesion in the stomach. This, of course, accounts for the exaggerated emesis. Another characteristic lesion is an intense conjunctivitis, which the farmers usually call "red eye." The eyelids may be edematous. The lesions vary, however, with the length of illness; animal dying within a very short period may exhibit almost no lesions.

Course.—Swine erysipelas, except for perhaps the acute and septicemic types, is preeminently an environmental infection. There seems little spread from animal to animal in the chronic and subacute cases, except as the premises become infected. Swine erysipelas may have a tendency to progress from the mild to severe types. Thus, at its first appearance on a farm, usually but a few animals are af-

Erysipelas in Swine

type of the disease. Such cases are apt to be overlooked. The following year a much larger number may be affected and the condition will be more marked. By the third year still more animals may succumb to the infection, and there may be some or even considerable mortality among cases of the subacute type. By the fourth or fifth year that the disease occurs on a given premises, the acute type is almost sure, or at least quite apt, to occur, and devastating losses will be experienced.

Outbreaks may not be called to the attention of a veterinarian until the acute state is reached, and it may take considerable investigation to bring out the full history. A consideration of the history of the outbreak is of material aid in making a clinical diagnosis.

Differential diagnosis.—A laboratory examination and identification of the *B. erysipelatis suis* is almost essential to a definite diagnosis. Where the disease is manifested by lameness and enlargement of the joints, it needs to be differentiated from rheumatism which is more inconstant in its symptoms; from rickets in which the facial bones too are usually distorted; from *pyogenes* infection in which there is a greater tendency to pus formation in the joints and enlarged bones; from *Br. abortus* infection by the agglutination test, and from streptococcic infection which is more acute.

In chronic swine erysipelas where the lesions are chiefly urticarial, differentiation from ergotism, fagopyrism, trifoliosis, mange, freezing and other dermatoses is required.

The subacute type requires to be differentiated from post-vaccination ailments. This is accomplished by consideration of the history and the lesions found on autopsy.

The acute type is likely to be confused with hog cholera and with food poisoning. The history here is a valuable means of differentiation. In anthrax infected districts it may be mistaken for anthrax. The absence of swelling about the neck is a point of differentiation from anthrax.

ADDITIONAL NOTES ON WHIPWORM ELIMINATION

Since reporting "Effective Whipworm Treatment" in the December, 1930, issue of VETERINARY MEDICINE, the writer has had cases in which seven and eight treatments were found necessary to rid the dog of these parasites. The presence of much injesta in the cecum at the time of treatment, or the peculiar conformation of this viscus, possibly accounts for the necessity of so many treatments to remove all the worms.

Frequent microscopic fecal examinations until two negatives are procured invariably insures a cure. In the writer's experience not a single case was shown to be infested even many months after two negatives have been obtained. No case has been found to be incurable.

The treatment consists of one drop of oil of chenopodium per pound weight of dog in an ounce of bland oil, as mineral oil or cod liver oil, introduced into or near the cecum by means of a turkey catheter *via* the rectum.

The small sized turkey catheter with tube about 16 inches long will do for most dogs. The large turkey catheter may be used for very large dogs like Irish wolfhounds.

Two and one-half ounces of bland oil should be used in the giant breeds and one-quarter or one-half ounce in toy breeds.

The best time to treat is in the morning before feeding, and after defecation. Defecation can be effected by a treatment. If during a treatment it is found that the lower bowel contains any considerable quantity of feces, another treatment may be given immediately after defecation. Reasonable care should be exercised to avoid puncturing the intestine. If the end of the tube meets with resistance, gentle partial withdrawing and manipulation will succeed in getting the tube far enough into the bowel to discharge the dose with the hind parts somewhat elevated.

This treatment is attended with much less danger than any other worm treat-

ment. If this dosage of oil of chenopodium is given *per os* its toxic effect is far greater. In only one case has the writer observed any general unfavorable result, and that was a temporary deafness following about 20 minutes of slight dizziness. The deafness lasted three weeks.

F. G. Steinbach.

Wildwood Crest, New Jersey.

PROPHETIC VISION

William Dick, founder of the Royal (Dick) Veterinary College of Edinburgh, Scotland, writing of the liver fluke in 1841, said: "Its history is yet involved in obscurity. Whether with the rank grasses on marshy lands sheep ingest the ova of the future parasite is a point which remains to be investigated."

Speaking of nicking and docking, he said: "We believe the time will come when even the cow-leech will perceive the absurdity of endeavoring to improve upon the fair forms of the most graceful works of nature, and will leave the horse's tail no less ornamental than useful."

Speaking of glanders and farcy, he said: "One author mentions that no fewer than 60 causes of the complaint have been enumerated; hence it may safely be concluded that the true one has not yet been found."

MALIGNANT EDEMA IN A HORSE

A 1400-pound horse, 12 years old, swollen enormously on the breast, extending up well under the throat, back between the fore-legs, back to his sheath, on the outside of each shoulder down to the knees, hard and feverish, labored respiration, fast pulse, temperature 104° F., poor appetite, started with a swelling in left arm pit about six inches long two inches thick and spread to the extent stated.

I was called two weeks after the ailment was first noticed. I could not get it under control. The horse lived another week and died. This was not a manger bruise. What caused it? What is the proper treatment?—E. J. W., Illinois.

Reply: I had a case like this last year. I thought at first it was septicemia, but treatment was of no avail. I took samples of the blood up to the university bacteriological department and they found the malignant edema bacillus. I have had only several cases of this in twenty years. Where it comes from or why it is not more common I am unable to say. About the only thing one can do is to get a laboratory report for an alibi. These cases are hard to handle, even from the beginning.—E. T. B.

The guinea pig, or cavy like Uriah Heep, is a very "umble person," but does its work in the bacteriological laboratory with neatness and dispatch. It will act as host or hostess for almost any germ now in captivity. It will even go sa far as to improve on the original type and bring joy to the scientist as he bends over a microscope. It shares with the rabbit and rat a most important place in experimental and diagnostic research.—E. T. B.

Further Studies on Commercial Dog Foods — Dry Food

JOHN W. PATTON, East Lansing, Mich.

IT IS rather common to refer to the dog as a carnivorous animal and feed him an omnivorous diet. Regardless of his status in this respect the adequacy of the animal protein in his diet is a pertinent consideration. When the dog's diet consists of fresh meat scraps from the table, bones from the butcher shop, or meat, canned or otherwise, the animal protein requirements are met, adequately or otherwise, in a simple manner compared with the problem of the manufacturer of dry dog food who has to rely on animal protein in a dry form.

If the beef packer were to make a dry dog food, the source of the animal protein could readily be fresh beef, but this would be a rather unusual side-line for the meat packer. One manufacutrer of canned dog food does use fresh horse flesh in his biscuit—the majority use some form of scrap or so-called dehydrated beef. A study of the accompanying charts will give one an idea of the source of some of the "dry meat" that goes into many dog biscuits—a product which has been sold by the packer or other producer as fertilizer and in many instances is more suitable for such purposes than for food for any animal. When we face the facts of the animal protein requirements of the dog and evaluate the available material at hand we are forced to the conclusion that the problem of adequate or satisfactory available sources of animal protein for inclusion in a dry dog food is a difficult one. Adequate and highly satisfactory proteins are obtainable but these cannot compete with the average run of proteins in price or the average appreciation of the manufacturer.

What do we expect from the manufacturer of dry dog food along this line? To use his own words, "fresh wholesome meat," would be quite acceptable but we would prefer to state it somewhat as follows: flesh, sweet and wholesome, either fresh or dehydrated, arranged according to formula, permitting an array of essential vital tissues and not containing the carcasses of condemned animals or portions

This discussion is a continuation of the general discussion by the author on commercial dog foods, the publication of which began in the May issue of this magazine and was continued in the August issue. The discussion will continue for some months longer. In the next installment, which will appear in an early issue Doctor Patton will deal with canned dog foods.

The veterinarians' concern in commercial dog foods is a peculiarly intimate one, and his desire for accurate information as to the adequacy of available brands correspondingly great. As a feeder of a considerable number of dogs continuously in his hands as patients, and in most instances, at certain seasons, a materially larger number as boarders, the veterinarian is personally concerned in the quality of the commercial foods upon which he depends. Further, not a few veterinarians act as distributors for dog foods for the convenience of clients or for the profit in its sale. As such, they have a business or financial responsibility for the quality of the product sold. As expert adviser to most his dog owning clients in the selection of foods for their pets, the veterinarian has a professional responsibility for the adequacy of the foods recommended. And, lastly, the veterinarian is acutely interested in that larger professional aspect—the influence of the food supply, direct or indirect, "even to the second and third generation," on the prevalence and severity of disease and upon reproduction.

Recent discoveries in the science of nutrition have shown conclusively the part that adequacy or inadequacy of the diet plays in growth and health, and in the prevention or causation of a considerable number of ailments, and further, upon susceptibility to, and the tendency to recover from an even greater number of diseases of both man and animals. Unlike commercial feeds for the food producing animals, the labels upon and the claims for which, are regulated by law, there seems to be no restriction upon the claims made for dog foods except the conscience of the manufacturer and, in the majority of instances no better basis for those claims than for the claims for Bowman's Bran and Brown Sugar or Robert's Waukesha Water for the cure of infectious abortion—that is to say, testimonials which scientifically mean just exactly nothing. The fact that the dog owning public has no legal protection in the matter of unwarranted claims made for dog foods but renders the veterinarians' responsibility the greater.—Editor.

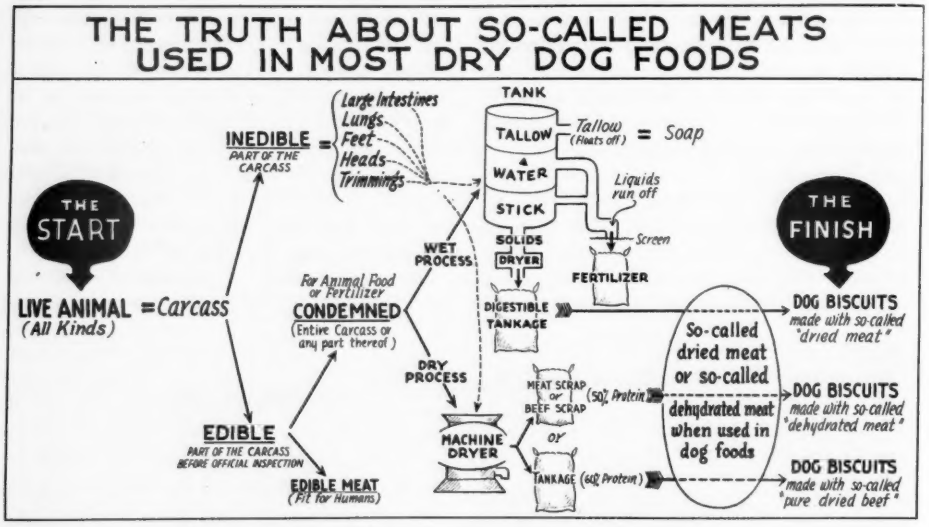
thereof and consisting in no part of carcasses of dead animals. In case it should be thought these requirements are too strict I will state that such requirements are not only practicable but it is our opinion that they are attained by at least one manufacturer of dog biscuit whose product sells for the average price. It is interesting to note to what extremes some manufacturers will go along other lines. Let us take for instance so-called "beef scrap," the majority of which is meat scrap, one of the most common sources from which an attempt is made to meet the protein requirement of dog foods. Again the accompanying charts tell the story better than words.

Meat Scrap (Meat Packer)

Meat scrap is a by-product often glorified under the name of "dehydrated beef" while in reality offal, and generally inadequate in essential nutritional value. It is a by-product which varies greatly according to the manufacturer, its source, his methods and the amount of offal to be disposed of. A small establishment visited recently presented conditions positively obnoxious. The materials which went to make up this particular brand of meat scrap were cattle heads and horns with the minimum of flesh; lower leg bones, with the hoofs; large intestines, with their contents including ascarids and myriads of flies and maggots; all setting around in large barrels awaiting an opportunity to be dumped through an opening in the floor and into a large pressure cooker where this mess would be cooked for several hours in its own juice, dehydrated and ground. Dried blood and cracklings from the lard press are then added to bring up the protein analysis. In reality this is fertilizer and would be considered such by many packers. Possibly the condemned car-

The Author's Experimental Feeding Pens for Dogs—32 Pens 16x40 Feet. Double Fenced

casses and the carcasses of animals found dead in yard and cars which are added as opportunity permits justify the name "beef scrap." In justice to the U. S. Department of Agriculture, and the excellent service it renders in protecting us from such unscrupulous methods, it should be stated that this plant had State and not Federal Inspection.



This is one example of "Inspected dehydrated beef" which is being used all too commonly in dog food.

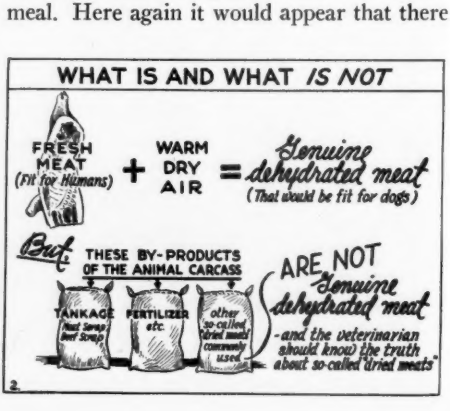
The larger packing establishments make fertilizer and tankage. Beef and meat scrap, condemned carcasses and portions thereof may readily find their way into either of these by-products. No animals found dead in the yards or cars enter the plant where Federal inspection is maintained; such carcasses go directly to the rendering works.

Tankage

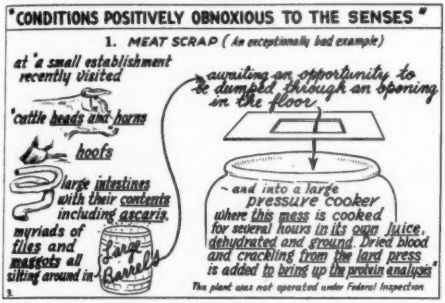
Tankage, meat scrap and stick appear to be one and the same depending on the methods of the particular manufacturer, his market and the protein analysis. They are all more or less interchangeable. They are all offal to be disposed of to the best advantage. Tankage and meat scrap made by the dry method are merely a question of amount of protein the sample analyzes. The juggling of chemical analyses appears to be a determining factor in whether it is meat scrap or fertilizer.

Meat Scrap (Rendering Works)

Rendering works furnish some manufacturers of dog food their protein requirements. Where do rendering plants obtain most of their material which is converted into "dehydrated beef, meat scrap or beef scrap"? Its source is well known—offal from the butcher shops, carrion from the country and dead animals from the packing establishments constitute a considerable source of their supply. What are their products? To enumerate a few, meat scrap, tankage, fertilizer, glue, tallow and bone-meal. Here again it would appear that there



could be considerable difference in the quality of the product from our point of view. On the whole anyone who has had the misfortune to be in the vicinity of some rendering works can hardly conceive of anything edible, for any animal, coming from such establishments. Yet some manufacturers of


"CONDITIONS POSITIVELY OBNOXIOUS TO THE SENSES"
1. MEAT SCRAP (An exceptionally bad example)
at a small establishment recently visited
awaiting an opportunity to be dumped through an opening in the floor
cattle heads and horns
hoofs
large intestines with their contents including ascaris,
myriads of flies and maggots all sitting around in
Large Barrels
and into a large pressure cooker where this mess is cooked for several hours in its own juice, dehydrated and ground. Dried blood and crackling from the lard press is added to bring up the protein analysis
This plant was not operated under Federal Inspection

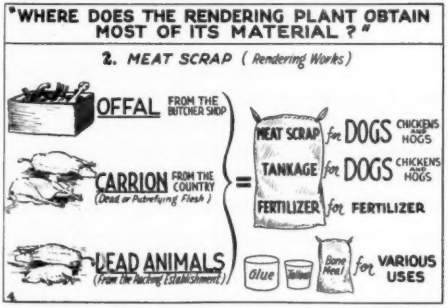
dog food obtain their animal protein from such sources, and from no other.

Pork Crackling

This is a pork residue obtained from the presses in the manufacture of lard. All of the fat is pressed out and the resulting cake is either sold as is, or ground up into a coarse meal. This article is relatively high in protein and low in biological value comparatively speaking. It is sometimes used to bring up the protein content of meat scrap and it is not uncommon to find it containing hair and rind. As it comes from the lard press it is a relatively clean by-product.

Dehydrated Beef (from the Manufacture of Beef Juice)

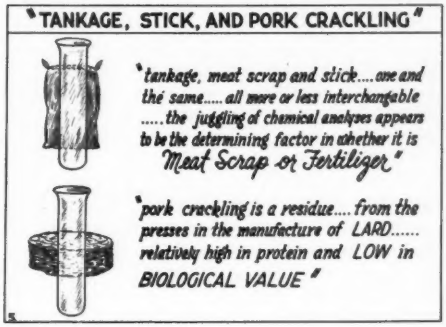
This is a by-product obtained from manufacturing plants who specialize in beef juice,


"WHERE DOES THE RENDERING PLANT OBTAIN MOST OF ITS MATERIAL?"
2. MEAT SCRAP (Rendering Works)
OFFAL FROM THE BUTCHER SHOP
CARRION FROM THE COUNTRY (Dead or Putrefying Flesh)
DEAD ANIMALS (From the Packing Establishment)
=
MEAT SCRAP for DOGS CHICKENS AND HOGS
TANKAGE for DOGS CHICKENS AND HOGS
FERTILIZER for FERTILIZER
Glue
Tallow
Bone Meal
for VARIOUS USES

and as far as cleanliness is concerned, it is above reproach and fit for human consumption. As the writer understands their process: lean muscle tissue is macerated in water and the juice pressed out, the resulting cake is dehydrated and ground. This protein is rather expensive for the dog food manufacturer as it finds a ready sale for pharmaceutical manufacture; however, one or two dog food manufacturers use this protein in their dog biscuits. As to its adequacy it cannot, at most, be any more suitable than lean muscle tissue.

Stick

In the larger packing establishments dry rendering, to a large degree, has replaced the wet rendering process. Stick is, as the writer understands it, that portion of the wet rendering process which remains after

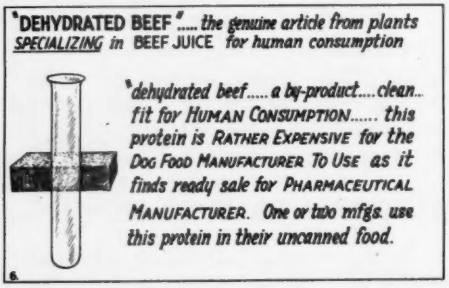

"TANKAGE, STICK, AND PORK CRACKLING"
"tankage, meat scrap and stick.... one and the same.... all more or less interchangable ..... the juggling of chemical analyses appears to be the determining factor in whether it is Meat Scrap or Fertilizer"
"pork crackling is a residue.... from the presses in the manufacture of LARD..... relatively high in protein and LOW in BIOLOGICAL VALUE"

the tallow and fats have been run off. It is divided into stick and liquid stick. Attention is again called to the accompanying charts showing diagrammatically the processes in wet rendering. Presumably any offal, which can find its way into meat scrap can get into the wet rendering tanks. Possibly other materials also which do not get into meat scrap can get into the wet rendering tanks. The liquid stick must contain much of the original material in solution—like the liquid portion of stew. This liquid is dehydrated to some extent and eventually finds its way into one of the scraps, or is mixed with stomach contents and eventually becomes scrap, tankage or fertilizer. The semisolid portion of this mess is dehydrated and is called stick. Stick like the proverbial hash is obtained when they clean up the plant. It cannot be any better material, regardless of what we call it, than the material

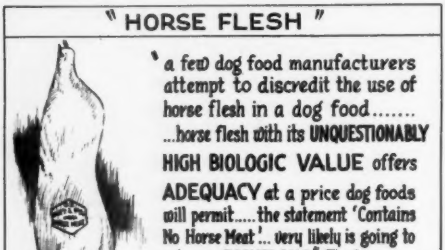
that goes into the tank and nothing very satisfactory goes into the tanks in the case of the meat packer. In the case of the rendering works use your own judgment! This much is known, not a few dog food manufacturers use stick as a source of animal protein in their product.

Horse Flesh

It would appear that many of the laity and some members of the profession abetted


"DEHYDRATED BEEF"..... the genuine article from plants
SPECIALIZING in BEEF JUICE for human consumption
"dehydrated beef..... a by-product.... clean.. fit for HUMAN CONSUMPTION..... this protein is RATHER EXPENSIVE for the DOG FOOD MANUFACTURER TO USE as it finds ready sale for PHARMACEUTICAL MANUFACTURER. One or two mfgs. use this protein in their uncanned food.
6.

by a few dog food manufacturers, look with disfavor upon the use of horse flesh in a dog food. In the case of veterinarians that attitude is of course for esthetic reasons, and the writer appreciates their feelings. I have as great an affection for the horse as anyone and own two polo ponies I should


"HORSE FLESH"
"a few dog food manufacturers attempt to discredit the use of horse flesh in a dog food..... ...horse flesh with its UNQUESTIONABLY HIGH BIOLOGIC VALUE offers ADEQUACY at a price dog foods will permit..... the statement 'Contains No Horse Meat'... very likely is going to act as a BOOMERANG." The horse can do a nice job of pulling us out of a nasty mess.
7

certainly hate to see "go to the dogs." The uninformed, it would appear, also attempt to discredit horse flesh on the grounds that it is of inferior nutritional value. This basis of assumption, even in the absence of scientific proof, is not in keeping with the probable scientific facts. It is quite reasonable to assume that horse flesh—tissue for tissue—compares favorably in biological value with beef, and is higher than some other sources most commonly used. The animal and the tissue are important considerations. In this respect horse flesh has a decided advantage. From our point of view it is most difficult to make an adequate protein without control of the animal carcass, we cannot expect to compete with products which have a high value as food for human consumption neither can we make it from the offal at hand. Horse flesh and possibly reindeer meat are worth serious consideration as offering an economical source of animal protein for dog foods. Horse flesh, with its unquestionably high biological value and its low economic importance as a food for human consumption in this country, offers adequacy at a price dog food will permit. It is not my intention to convey the impression that the beef packer can not meet the standard of adequacy—but rather that the packer of horse flesh can do so more economically. Some manufacturers of dog food without esthetic reasons for so doing or appreciating its value attempt to discredit horse flesh because it appears to be the thing to say. This attitude is unjustified and is likely to act as a boomerang. The statement, "contains no horse flesh," in the final analysis simply means that one economical source of an adequate animal protein has not been used.

When we consider that adequate animal protein is a vital consideration in a dog food and then survey the materials we have been using to meet this need, we are forced to the realization that, generally speaking, the manufacturer of dog food either lacks appreciation of what is suitable in the way of a dog food or is more interested in making something to sell than in making something worth selling. It is admitted that it is difficult to see the inner workings of a meat packing establishment and next to impossible to see what goes on in a rendering plant. This difficulty will not excuse very many for obtaining an inferior product because they went after protein and they went after it at the lowest price possible. It appears to have made very little difference to many where the protein came from. We

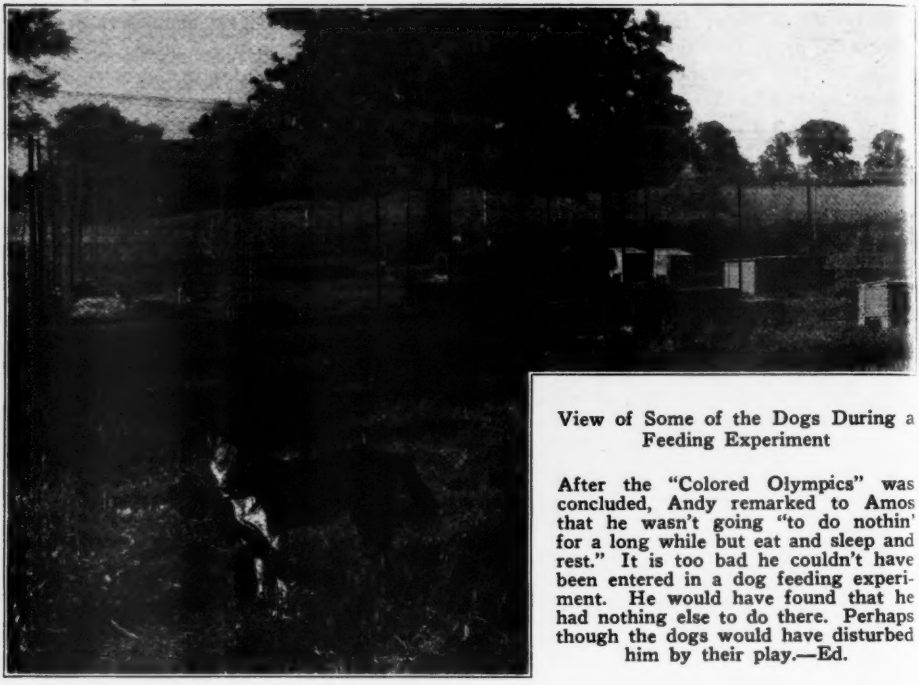
find ourselves today facing the charge of producing grave nutritional disturbances because of this ignorance. Some manufacturers appreciate this now and many have come to the realization that tangage and fertilizer made from the carcasses of dead animals have no place in dog food.

The next thing is what can be done about it. Some manufactures are on record in attempting to discredit horse flesh, perhaps this is that boomerang. Dry dog food, like similar food for man, owes its origin to the days of the sailing ship when no more advantageous use could be found for "hard-tack" but "hard-tack" has had its day and the sooner this is appreciated the better. It left a lurid record of scurvy among ships crews and malnutrition in prison camps and elsewhere. That it was accepted in the past is no indication that it will continue satisfactory under present-day methods and appreciations.

A Corner in the Author's Biological Laboratory

We are promised a balanced food on the labels of most packages of dog food and the buying public is pretty well sold on the idea and a lop-sided food can not go very far. Very few measure up to the balanced-food standard. A few manufacturers have been farsighted in this matter. They have invested large amounts in the study of this problem and in obtaining a better knowledge of their particular products. Today they are in an enviable position. Nutritional research takes time and money and it is going to take plenty of both for the "profit takers" to catch up with those having from one to several years' start in scientific inquiry into what is required in this field.

In all of the writers' visits to dog biscuit manufacturing plants only one establishment was found where anything approaching fresh flesh was being used—this was horse flesh. This concern is unquestionably in position to make its source adequate and is sufficiently well informed to do so. Most all of those who would, by their printed word, lead us to suppose that fresh meat was being used in their dry dog foods, appear, by their own statements, to be able to work out the lean meat equivalent of tankage or meat scrap. How the average run of such material can be translated into terms of fresh lean beef is beyond our comprehension. One manufacturer of dog food that



View of Some of the Dogs During a Feeding Experiment

After the "Colored Olympics" was concluded, Andy remarked to Amos that he wasn't going "to do nothin' for a long while but eat and sleep and rest." It is too bad he couldn't have been entered in a dog feeding experiment. He would have found that he had nothing else to do there. Perhaps though the dogs would have disturbed him by their play.—Ed.

we visited claimed to be using fresh scrap from a local packing establishment and by the aid of ingenious machinery was able to grind this material, bones with fractions of adhering tissue, into such form as to permit of its inclusion in his dry food. We were anxious to see this machine process in operation—but of course could not insist.

In conclusion: Many of the uncanned dog foods on the market are not worthy of our support. The claims made for them are unsupported by anything in the nature of scientific evidence.

Others can readily produce grave nutritional disorders when fed exclusively, and have produced such disturbances in carefully controlled nutritional experiments which I have conducted.

Most of the protein used in uncanned dog foods is not alone inadequate but repulsive in origin and should find no place in the diet of a dog. *Were its true source known,* dog owners would in most instances handle it with repugnance and take it into their homes with reluctance.

IMMOBILIZING THE PARTS OF A FRACTURED JAW

After reading Doctor Blackburn's interesting discussion in the October issue of VETERINARY MEDICINE, I thought of an interesting case in a ten-month old German Shepherd that I treated.

This dog had been hit posterior to the symphysis involving the left canine tooth which was so loose that when I touched it it fell out. The salivary gland was involved and the animal was salivating profusely. At first I tried bronze dental wire, then kangaroo tendon, but nothing worked. I then purchased a muzzle like a hammock. On the bottom side I placed ortho-plastic bandages and built up to conform with the lower jaw. This was fixed and straps running around the back of the ears.

The animal was fed liquid food through a small rubber tube. This idea was utilized upon the suggestion of a client who had had his own jaw fractured and it had been completely immobilized by such a bandage.

Dayton, Ohio. C. L. Sanders.

Nephritis in Dogs*

By ROY H. SPAULDING, White Plains, New York

NEPHRITIS occurs in the dog far more frequently than is generally supposed. The fact that it rarely is seen as a primary disease adds to the tendency to overlook it. The symptoms of nephritis are obscure and not sufficiently well described in our textbooks to facilitate easy recognition. Collection of the urine from the dog is difficult, and the subsequent interpretation of the urine analysis is not an easy task for one who has not given it much study. It is impossible clinically to classify, accurately, the different forms of nephritis; one must be satisfied to differentiate merely between acute and chronic conditions. Even this is by no means easy without study of the patient. Because of the absence of sweat glands in the dog, proper elimination through the kidneys is of much greater importance than it is in the horse or man. In treating dogs we are handicapped greatly in producing quick elimination through our inability to resort to sweating.

Etiology

Acute inflammation of the kidney is generally considered to be due to cold, injuries or poisons. Mercury and arsenic are the most common poisons involved, but almost any drug that is absorbed through the skin or digestive tract passes through the kideys during elimination and in sufficient concentration will cause inflammation. Santonin, used in large and continuous dosage in the treatment of whipworm infestation, will cause inflammation of the kidneys; usually of a chronic nature. Acute nephritis is encountered secondary to infections, infectious diseases and toxemia. In my experience I find this the most common cause and *vice versa* intestinal toxemia develops often in dogs suffering from a chronic nephritis. Many cases of distemper are complicated by the development of nephritis in the latter stages. Certain breeds of dogs seem to be more disposed to nephritis than others. Notable among these are English Sheep dogs. Pyelitis, or pus in the pelvis of the kidney, is usually caused by the colon bacillus which gains entrance through the external genitals and works its way up through the urinary tract.

Symptoms

Slight inflammatory conditions of the kidneys are rarely recognized, since the diagnostic points are to be found only on examination of the urine. When the disease develops as a primary condition to such a degree as to become recognizable, the principal symptom, in mild attacks, is stiffness in the hind legs. This may vary from a slight stiffness, which may be mistaken for rheumatism, to almost complete loss of the use of the limbs. This latter may be laid, wrongly, to an inflammation of the spinal cord. This stiffness will persist for a long time without responding to the ordinary treatment. The dog will evince pain on palpation over the region of the kidneys and may show extreme soreness from movement. There will be some diminution in the appetite and more or less listlessness. To the casual observer the character and quantity of the urine and the frequency of micturition will seem normal; however, on close observation it will be found that the quantity of urine is lessened somewhat. There will be no other symptims to suggest that the kidneys are involved. I had a case recently presenting just these symptoms. There was, however, a history of an injury to the spinal cord some two years previously which was followed by paralysis. I diagnosed the condition as an inflammation of a section of the spinal cord and was supported by an eminent consultant. Ordinary treatment failed and we resorted to the cautery applied along the cord. The re-

*Presented at a meeting of the Hudson Valley Veterinary Medical Society, Catskill, New York, May 13, 1931.

sult was a severe case of nephritis. Going back over the immediate history of the case it was easy to see that the dog had been suffering from nephritis for a period of about six weeks.

In the more severe cases of nephritis the symptoms shown are not unlike pleurisy. The temperature is high, even up to 105° F., breathing rapid, labored and often accompanied by groaning. The gait is very stiff and movement painful. The pulse is usually weak and thready. Differentiation from pleurisy, however, is made, readily, by the absence of friction sounds, or increased pulmonary sounds, and by the fact that, while the legs are stiff, the chest is not held with the usual rigidity of pleurisy. There is a discharge from the eyes and usually a nasal discharge. There is complete loss of appetite for food and usually no desire for water. The urine is scanty in amount and of high color; sometimes coffee-colored. I have not observed that the dog exhibits any difficulty or pain on urination. There is great weakness, fatigue and drowsiness. In extreme cases symptims of uremia are in evidence. There is a rigidity of the muscles of the legs, with little or no ability to stand. There may be twitchings of some of the muscles, especially those about the head; the pulse is very feeble. Little or no urine is eliminated. When this stage is reached, there can be little hope for recovery.

Those cases which occur during or following an attack of toxemia are difficult to recognize. A chronic nephritis is probably often present at the onset of the disease and is aggravated by the lack of elimination through the intestinal tract and the subsequent accumulation of toxins in the system. Sometimes the toxic condition seems to be well in hand when the animal suddenly has a relapse; in other cases the animal does not respond to treatment. Even in those cases that are under close observation there is seldom reason to believe that the kidneys are involved. There is very little change in the quantity of urine or in the quality so far as can be observed from inspection and the condition will be recognized, definitely, only by making an analysis of the urine. One quite noticeable symptom which occurs in many of these cases is the craving for water, seen at the onset, becomes lessened to such a degree that it is almost impossible to get the animal to take any water at all.

In pyelitis the principal symptom is a sudden rise in temperature which may go as high as 106° F. with accompanying depression, loss of appetite and weakness. Stiffness and pain are not usual. The quantity and character of the urine are not altered macroscopically. In severe cases a sediment made up of flocculi of pus may be see under the low power microscope.

The interpretation of the findings of an examination of the urine is very difficult for me, since they are not all consistent. However, as I study one urine analysis after another and fit it to the case and compare it with others I find it is capable of revealing a great deal of information. The specific gravity of urine is increased when the quantity of urine is decreased and *vice versa*. In the early stage of acute nephritis the quantity of urine excreted is increased and in these circumstances the specific gravity is low. In some cases I have found it as low as 1.012. To me this means that while the inflammatory processes are present the animal has been consuming large quantities of liquids and a thorough flushing of the kidneys is going on, which is just the ideal condition. I have found that the percentage of recoveries has been high under these circumstances. However, if the inflammatory process in the kidneys progresses to a point where function is interfered with, the volume of urine decreases and the specific gravity rises materially above normal. This is an unfavorable symptom and presages uremic poisoning if it is not counteracted by treatment.

The *reaction* of the dog's urine should be acid, and usually is; but I have had some few cases where it was neutral or slightly alkaline. Whenever such a con-

dition is present it indicates, in addition to nephritis, an inflammation of the bladder or a decomposition of urine in the bladder due to retention.

The *color* of the urine in acute nephritis will vary from a normal pale amber, to deep amber, to reddish brown or coffee color. The color is usually due to pigments derived from the bile. The presence of blood gives a reddish brown color. A dark brown color, I have found, is due to large quantities of bile and is quite diagnostic of mercury poisoning. Where the color of the urine in acute nephritis remains light, the prognosis is more favorable than otherwise. In chronic nephritis where large quantities of urine are being passed the color is exceedingly pale.

Albumin is always present in the urine in acute nephritis in varying amounts; in general it is present in proportion to the acuteness and severity of the attack. In some cases it may be so abundant as to give a turbid appearance to the urine. The presence of albumin is not alone diagnostic of nephritis, since it may appear as a result of pulmonary or other severe febrile diseases. It may be due also to pressure from tumors or pregnancy, to certain nervous diseases and to some drugs. In chronic nephritis albumin is seldom present in any considerable quantity, but in most of my cases a trace has been found. When albumin is found in the urine accompanied by casts, a diagnosis of acute nephritis can be made with certainty. The casts are usually of the hyaline type, but in severe cases tubules or epithelium casts are found also. In chronic nephritis fatty or waxy casts are more often present.

Sugar is usually absent in the urine of nephritis, but may appear occasionally during convalescence.

Urea is usually decreased to some extent and in the majority of cases is found in from 1.5 to 2%. Where urea is found in any greater quantity it is necessary to eliminate protein from the diet.

A trace of *bile* is usually found in the urine in all cases of acute nephritis and in those which are associated with toxemia it will appear in much larger quantities.

Blood is seldom found in the urine of nephritis except in severe acute attacks, but a few leukocytes are usually present.

A trace of *pus* is likewise pretty generally seen but is of no great concern except when it occurs in large quantities, signifying pyelitis.

Course

Acute cases of nephritis last from one to three weeks before general improvement is seen. It is often six to eight weeks before the urine is entirely clear. When the quantity of urine is good and the color light, improvement may be noticed in a few days. Those cases which carry an initial fever run eight to ten days before the temperature begins to drop and then it is very apt to go to subnormal. The general condition of the animal becomes favorable, however, long before there is any appreciable decrease in the amount of albumin or the number of casts and it is necessary to make repeated examinations of the urine in order to establish the true condition of the patient.

The prognosis must be guarded in all cases. This is especially true where the amount of urine is limited, since uremia is apt to develop at any stage, and then the prospects for recovery are slight.

Treatment

In treating nephritis, whether it be acute or chronic, mild or severe, I always use Nephritin as my chief medicament. The dose depends on the severity and acuteness of the attack. I usually use five grains every three hours in dogs up to thirty pounds, but I have given ten grains every hour with gratifying results. I feel that Nephritin stimulates the kid-

neys to function rather than forcing them beyond their capacity. In addition a saline laxative is indicated to promote intestinal elimination. For this I use a preparation known as Patch's Urimene Compound, which is a combination of hexamethylene, lithium citrate, sodium phosphate, sodium sulphate and sodium tartrate. Sal hexamine and sal hepatica are of about the same composition. These preparations are tolerated better than most other salines and produce desirable results. I give my saline in teaspoonful doses, two or three times a day, in a liberal amount of hot water. Where much pus is present in the urine additional hexamethylene is given. High colonic irrigations of bicarbonate of soda or sodium chloride are used, two or three times a day at the onset, to promote as much elimination by the bowels as possible.

For food and drink I use acidophilous milk and occasionally buttermilk; however, I prefer the former. By withholding water most dogs will take the milk readily. Some like it exceedingly well. Where they take plenty of milk I also give free access to water. The more fluid ingested the better. The only contra-indication is vomiting, and in such cases I use small and often repeated doses of hot water. The milk is excellent for promoting peristalsis with subsequent elimination and also has a beneficial effect on the kidneys. It is well tolerated by the stomach and rarely causes vomiting; in fact, I think it stops such a tendency. I like to get about one and one-half pints of milk into the ordinary small dog in 24 hours. If the dog will not take the milk I force-feed him, giving a couple of ounces every two or three hours. As soon as the improvement warrants, I start with small quantities of raw beef, increasing the quantity very slowly as tolerance is shown.

The dog suffering from nephritis should be kept warm and as quiet as possible, since exertion increases the work required of the kidneys. Such supportive treatment as may be required is administered, as the occasion arises.

Bull (1929) described a skin disease, dermatomycosis (lumpy or matted wool) in Australia, the lesions of which are identical with those encountered in lumpy wool in South Africa. He has established the cause of the Australian lumpy wool to be a fungus which he termed *Actinomyces dermatonomus*. The disease affects only young Merino sheep. It is of rare occurrence, but in some flocks he has found up to 20% of the young animals affected.—D. G. Steyn in the 17th Report of the Director of Veterinary Services and Animal Industry, Pretoria, Union of South Africa.

Steyn concludes from experimentation that 22.5 grams of sulphur per week for sheep, administered in three daily doses of 7.5 grams, over a period of four months, has no deleterious effect on the health of the animals, whereas double this amount, 45 grams per week per sheep over a period of 35 days, given in three daily doses of 15 grams each, causes symptoms of poisoning and a high mortality. The object in establishing the tolerance of sheep for sulphur was because this agent is recommended as an efficient preventative for prussic acid poisoning. Ordinary flowers of sulphur were used in the investigation.—17th Report of the Director of Veterinary Services and Animal Industry, Pretoria, Union of South Africa.

Yakimoff on the question of Spirillae in bovine abortion seems of opinion that *Vibrio foetus* should be considered along side *Br. abortus* as a cause of abortion. McFadyean and Stockman were the first to investigate abortion due to Spirillae in sheep and also encountered the organism associated with abortion in cattle in Ireland and Wales. Smith in America observed some fourteen cases of abortion from which pure cultures of the Vibrio were obtained. Subsequently various workers have described Vibrio abortion both in sheep and cattle in America and Europe.—P. S. Synman, in the 17th Report of the Director of Veterinary Services and Animal Industry, Pretoria, Union of South Africa.

Thoughts on Food Inspection

By W. G. HOLLINGSWORTH, Utica, New York

ENHANCING public health is a most laudable undertaking; it should be encouraged. A concern for the health of the public had its beginning, in what we now call preventive medicine, early in the 18th century. At that time, the only sections of society to which scientific principles of preventive medicine could be applied, directly to the mass, were the naval and military forces. Among the reformers who brought about an improvement of the health of the naval and military personnel, an important place belongs to Sir John Pringle (1707-1782), a Scot, pupil of Boerhaave. His teachings are applicable today.

More than 2,000 years before the day of Pringle a Greek philosopher had taught some of the principles of hygiene. Socrates, born B. C. 469, the greatest philosopher of his time, a student of truth, cause and facts, was distinguished chiefly by his theory of right. To do right according to his teaching was the only road to health, wealth and happiness and prosperity. Vice and lack of knowledge could arise only from ignorance or mistaken ideas as to the means. Hence, the proper corrective is an enlarged teaching of the consequences of actions. He would stroll through the market places and seeing food displayed, handled, prepared, dispensed and served in a very unsatisfactory manner, often exclaimed: "How much there is in this world that I do not want." Could he stroll through our markets today, after 2,500 years, I think he should be moved to the same statement.

Agriculture is our basic industry. The world absolutely depends upon this science, this industry, for the quantity, quality and variety of its food. And food is the world's greatest problem. There must be a better cooperative spirit between the farm and urban population. The farmer is not only a producer but a great consumer. We are all consumers, all our lives; but producers only a part of our lives.

The span of life has been lengthened to a great extent by the wholesomeness of the food consumed. The lengthening of life interests everyone. The people are awakening to the ideals of food hygiene. Food hygiene, however, is too complex for the untrained to meddle with in safety.

Public Health is purchasable. Any community within natural limitations can control its own death rate. The efficiency of Public Health authorities in any municipality is governed by the money available for public health purposes. Pasteur said there are two laws contesting with one another, one the law of death, the other the law of health God only knows which of these will gain the upper hand, the result is up to the guardians of health. No business is bigger than the business of keeping well. Public policy requires conservation of human life.

The purposes of food are to supply and renew the waste of tissues of the body, to furnish heat, to keep us warm and to supply the energy necessary for the performance of our various tasks.

The first requisite in a food supply for a nation, state or community is that it shall be sufficient in amount, wholesome in quality and well balanced. A policy that safeguards and guarantees an adequate food supply is the primary consideration of a people. Pure food laws, meat and milk inspection acts, local surveillance over markets, provision shops, milk plants, dairies and food handlers in the matter of their health are all parts of the general movement to obtain a wholesome food supply.

The purpose of food hygiene is to prevent sickness, save lives, and avoid suffering. By its effectiveness in accomplishing these ends, it must be judged. There is no doubt the present facilities in a great many municipalities for insuring a wholesome food supply are very inadequate. Little would be necessary in many of these places to start the wheels of preventive medicine in motion and the movement would become popular immediately.

Due to the fact that food poisoning cases are not necessarily reportable, except in cases of considerable size, we have no conception of how many people in this country are taken seriously ill daily, due to unwholesome food. Illness results in the loss of 275,000,000 days annually in the United States and its cost is estimated at 15 billions of dollars. We are told that at least six billion dollars of this loss could be eliminated if the public would obey the rules of health.

Meat and milk and their products are the two major divisions of our food supply with which the food inspector has to contend. Much creditable work has been done in this state in milk inspection, of which the state department of health is the sponsor. But in meat inspection there is great laxity. About 65% of meat consumed is produced under federal inspection. What is the character of the remaining 35%, where no municipal inspection is maintained?

Adequate state meat inspection supplementing the federal meat inspection would benefit the livestock industry and local packing interests as well as the consuming public. It would eliminate many unscrupulous men from the industry. Men who make a business of killing any animals that they can buy cheap, with no attention paid to its state of health; thus competing with honest dealers who conduct their business in a legitimate way. Consumers should demand that meat and its products be properly inspected by efficient inspectors. Eternal vigilance is the price of safety.

Rich estimates the direct and indirect animal loss from contagious abortion in the United States is $175,000,000. In a commercial herd he divides the losses as follows: Butter fat loss, 39.1 per cent; calf loss, 17.1 per cent; depreciation, 2.9 per cent; sterility, 20.9 per cent. In pure bred herds, he divides the loss as follows: Butter fat loss, 17.7 per cent; calf loss, 41.2 per cent; depreciation, 20.1 per cent; sterility, 18.3 per cent; veterinary expenses, 2.7 per cent.—**Cornell Veterinarian,** 21-15.

Radium is worth more than 100,000 times its weight in gold—more than $2,000,000 per ounce troy.

The Farm Board admits a loss of 25 million dollars in its cotton speculation. To a government bureau a loss of only $25,000,000 is practically a profit.

In many states hog cholera virus can be purchased and used by anyone. Is it strange then that hog cholera is the greatest menace to the swine industry?—Mark Welsh.

Eighty-five per cent of the new outbreaks of hog cholera in Maryland are caused by feeding infected pork scraps to hogs. Hog cholera is spread by dumb humans rather than by dumb animals.—Mark Welsh.

The annual death rate per 100,000 from tuberculosis among the Indians of Montana and the whites living in the same counties, is: Indians, 1,327; mixed blood but one-quarter or more Indian, 339; mixed blood but less than one-fourth Indian, 52; White, 24. The death rate among the whites varies with the percentage of Indians in the community.

"Prolactin" is the name given to a new (the third) hormone isolated from the pituitary gland. Female guinea pigs and rabbits begin the production of milk immediately prolactin is injected.

"The horns become brittle, develop cracks and crevices near the base and break easily. A broken horn destroys the value of the ox as a work animal. Examination of many broken horns failed to show any infection by parasites or bacteria. The only explanation of the condition that can be offered is that the bloodvessels supplying the matrix of the horn becomes constricted by the thong that is wound around the base of the horns to attach the yoke. Thus, the nourishment of the horn is reduced, and its tone or condition is lowered. In the dairy cow, the same effect may be caused by the stakes and tie ropes that are in constant use."—Rpt. Porto Rico Agric. Exp. Sta.

Reviews and Abstracts

By FRITZ VOLKMAR, Columbus, Ohio

Torsion of the Uterus

[Caemmerer, 1932. Neuees über die Torsio Uteri. (New method of unfolding a Torsio Uteri.) Tierärztl. Rundschau 38(1):5.]

In those cases of torsio uteri in which the legs have entered the vagina, the author makes use of a two-pronged fork (Hauptner-Instrument) of which each prong is tied to one leg. On turning the fork in the direction opposite to the torsion, the fetus will finally correct itself and with it the uterus, so that there will be no folds impeding the delivery, which can be accomplished, thus, in a few minutes.

Vaginal Examination

[Euler, 1932. Die klinische Feststellung der chronischen Endometritis des Rindes. (Clinical diagnosis of chronic endometritis in cattle.) Tierärztl. Rundschau 38(4):51-53; (5):70-73.]

A thorough vaginal examination must include palpation and the inspection with the speculum. An important clue for differential diagnosis is the degree of moistness present. Changes in the secretions of the vagina and the cervix are valuable hints for diagnostic purposes. Inflammatory processes on the cervix almost always indicate a catarrhal condition of the endometrium. Rectal examination will adduce supplementary information for diagnosis.

A Cause of Enzootic Sterility

[Kurt and Uhrig, 1932. Klinische Beobachtungen über gehäuft auftretende Sterilität und seuchenhaft auftretendes Verkalben im Frürstaden der Trächtigkeit. (Clinical observations on mass-occurrencees of sterility and on enzootically occurring abortion during the early stages of pregnancy.) Tierärztl. Rundschau (38(6):85-88, (7): 104-106; (8):121-124.]

The author found granular venereal disease the primary cause of mass-occurrences of sterility and of enzootically occurring abortion in cattle. When a diseased bull breeds several cows in succession, not all of them will become infected. Those that are infected will show various and different symptoms of the disease. Older cows, as a rule, exhibit only slight symptoms: a few vesicles which seldom coalesce, while heifers usually present a severe inflammation of the vulva and profuse purulent-slimy secretion The mucosa of the vestibule will exhibit numerous small vesicles which soon become confluent and will form deep ulcers. The animals are always very unruly as a result of the severe pain. On individual farms having their own bulls, recovery can be accomplished successfully, but on cooperative farms with a common bull, eradication is not so easily accomplished due to lack of understanding of some of the members.

The measures for suppressing the disease in a herd are as follows: All the sexually mature animals of the herd are examined for diseases of the sexual organs. Those found diseased are to be treated by a veterinarian and are not allowed to be bred by the bull, until they are attested as healthy. The bulls, too, are to be examined and are treated regardless of lesions. Breeding is not to be resumed until all the animals are attested as healthy by the veterinarian. Prophylactically, previous to breeding, the vaginas of the cows and heifers are irrigated with body-warm saline solution. In bulls, the prepuce is rinsed with a mild, non-irritating antiseptic solution.

Rabbit Snuffles a Deficiency Disease

[Kudrijawzew, 1930. Etiology of contagious snuffles in rabbits. (Transl. title.) Westnik ssowremennoj weterinarii. 6(23/24):249-251. (Abstr. Tierärztl. Rundschau 38:77.]

From several observations and experiments, the author concludes that the so-called malignant snuffles, a disease of the upper respiratory tract of rabbits, represents a functional disturbance of the secretory glands, caused by A-avitaminosis. He considers the presence of microorganisms in the secretions a secondary manifestation. The diagnosis A-avitaminosis seems to be justified also by the appearance of the anatomical lesions and by inference from the fact that treatment of snuffles with cod liver oil gives good results, which fact would indicate that the A-vitamines are lacking, while proteins, phosphates, and B-vitamines, which prevent Xerophthalmia, are present in the food in sufficient amount.

Contributions to the Knowledge of Fowl Leucosis*

REVIEWING the series of experiments, one is hardly able to give a definite answer to explain the etiology of fowl leucemia. The fact that fowl leucemia is transmissible by means of a filtrable agent is no proof that it is caused by this same agent under natural conditions. Contradictorily, the experimental results clearly demonstrate that the transmissible virus does not play a rôle in the dissemination of this disease. If one reflects that all the secretions of leucemic fowls are virus-free, that the disease cannot be transmitted either by contact or by cohabitation, or even by bloodsucking parasites, then the question arises: Is the transmissible agent really an infectious agent of nature, is it at all an independent living organism which can exist outside the fowl?

It is true the virus is filtrable but adherent to albumin; precipitated with the albumin it will perish. Outside the blood circulation it is non-pathogenic, as a rule. It causes little or no fever. The organism does not produce antibodies. From this it follows that this agent which for lack of a better term is called virus, is not a microorganism, therefore no living organism at all. Any living, reproductive disease germ is body-foreign and on entering the body will cause a defensive reaction, revealed by fever, inflammation and antibody formation. Nothing like that is observed in normally occurring fowl leucemia. The blood picture alone, due to an inexplicable irritation of the bone marrow, undergoes changes. This irritation is caused by the transmissible agent which possesses the ability to stimulate proliferation of certain marrow-cells. It cannot be proved that this agent is a body-foreign matter. All the observations seem to indicate that it originates from the proliferating cells and that it remains always in the body without leaving the blood-circulation. This agent is never excreted from the body, therefore no contact infection can occur. It is pathogenic only when put into the blood circulation, hence all other modes of infection are without effect. Systematic histologic examinations have shown that advanced lesions are found in the bone marrow at a time when the proerythroblasts first begin to appear in the blood. Consequently, the transmissible agent must disturb the normal erythropoiesis very early. For the reason that the proerythroblasts, without being able to mature, are thrown into the blood circulation in great numbers, the blood picture will assume a leucemic character. Even in the anemic forms the proerythroblasts are found in vast numbers in the marrow, but they do not enter the blood in large numbers; therefore, the leucemic character of the blood is lacking. But even in this case the erythropoiesis is greatly disturbed, resulting in the creation of the anemic form. Thus, the type of the disease depends on the reactivity of the bone marrow. If the bone marrow strongly reacts toward the provocatory stimulus of the agent, then great numbers of proerythroblasts are forced into the blood circulation and the leucemic form will be in the making. On the other hand, if the reaction of the bone marrow is weak, then no flooding of the blood with leucosis cells will take place; the normal regeneration of the erythrocytes ceases, too, causing the development of the anemic type.

The transmissible agent, therefore, is merely a stimulative organism which forces the bone marrow to cell proliferation; it acts like an enzyme, causing the proliferative process of the proerythro-

*Jarmai, K., Stenszky, T., and Farkas, L., 1932. Neuere Beiträge zur Kenntnis der übertragbaren Hühnerleukose. (New contributions to the knowledge of transmissible fowl-leucosis.) Archiv Tierheilk. 65(1):46-71.—(Authors' discussion translated by F. Volkmar.)

blasts. It is absolutely irrelevant how much of this stimulative force is acting upon the bone marrow. During earlier experiments, while titrating the virus, it was observed that the duration of the disease is independent of the amount of the infectious agent. It often happened that an animal, injected with a small amount of infectious matter, became leucemic much earlier than others, injected with much larger amounts. This behavior is contrary to that usually observed in germ diseases, in which the greater dosage of infectious material shortens the duration of the disease, while the weaker dosage of infectious material lengthens it. Since this rule does not apply to fowl leucemia, it must be assumed that the transmissible element does not multiply independently in the body, and that its quantity and presence depend on the ability of the bone marrow to react. If the bone marrow reacts toward the virus in the manner described above, then the well-known disease forms result and the transmissible agent appears in the blood and in the organic protein as a product of the proliferated cells. However, if the bone marrow remains indifferent toward the agent, as for instance in the resistant animals, then no cell proliferation takes place and the morbid matter disappears because it is not reproduced. Animals which have recovered from the disease do not react any more to the agent because their hemopoietic apparatus is dulled already; the animals seem to be immune without the production of humoral antibodies. Influences, such as Roëntgen rays, thorium activity, which prevent the unlimited cell proliferation, will prevent also the production of the transmissible element, although, in vitro, the agent is not destroyed. When injected into the egg, the agent remains harmless, although the condition of incubation temperature is ideal for the growth in chicken albumin. However, in the fresh egg no cells are encountered which could receive the stimulative effect, therefore the reproduction is impossible and the result of the injection will be negative.

Much transplantation increases the virulence of the agent, but since it cannot multiply independently, its action remains inconstant. In very susceptible animals, that is, in animals capable of strong reaction, the duration of the disease will be shortened to 7 to 9 days, but if the animal organism reacts rather weakly, then the duration of the disease will be lengthened.

During earlier experiments it was observed that the serum of leucemic animals does not always produce infection, but that cell-containing material was always virulent; for instance, washed leucosis-cells in a dilution even as low as 1 to 12,000 could produce leucemia. Fürth, too, emphasizes that material rich in blood cells will act more certainly than plasma. By conserving the blood-cells in glycerine he was able to keep the transmissible agent virulent for 104 days.

The explanation of these findings may be that the transmissible agent, being the product of the proerythrocytes, is principally present in the proerythrocytes and possesses the faculty to transfer to the plasma. But it does not occur as constantly in the plasma as it does in the cells themselves. Consequently, the plasma is not always infectious. Filtration experiments, therefore, may prove negative, because sometimes the agent is absent from the organ-emulsion, perhaps for the reason that it was not freed from the cells, as a result of insufficient trituration.

It is generally known that the leucosis virus is strictly specific for the genus, that is, it is pathogenic for fowl only, and that pigeons and turkeys cannot be made sick. The reason for this specificity for the genus is that the transmissible agent does not exert any stimulus upon the marrow cells of these animals, because they are cell-foreign in spite of the close relationship.

It becomes clear that in this manner many otherwise inexplicable questions of the leucosis problem will find their solutions. However, it remains to be ex-

plained, how leucemia originates under natural conditions.

Since we cannot attribute practical importance to the infection theory, we must assume that the leucemia occurs spontaneously from as yet unknown stimuli in a manner similar to the one by which spontaneous tumors occur. For the purpose of elucidation, the transmissible fowl-tumors may be mentioned as an analogon. These tumors, too, contain a kind of virus and may be artificially transmitted from animal to animal. The likewise filtrable Rous-virus is pathogenic in the animal experiment alone, in spite of its high infectivity. The Rous-virus is not an independent living organism, but a growth-promoting cell-product which can be freed from the cell by filtration.

The leucosis virus now seems to be such a substance which is produced by the proerythrocytes that are thrown into excessive proliferation. It will also leave the cell to enter the plasma. We do not know the elements or the stimuli which excite the degenerative growth of the proerythrocytes. Once proliferation is caused, then the undifferentiated blood-cells will produce the transmissible agent in the same manner as is known from the transmissible fowl-tumors. The production of such growth promoting elements is a truly specific faculty of certain cells (derivates of the mesenchyme) of fowls, whereby the presence of an independent living organism is simulated. Therefore, the fowl leucosis cannot be brought into relationship with human leucosis.

In conclusion, we have reason to believe that erythroleucosis is not an infectious disease but an organic disease in which the cell proliferation of the erythropoietic system is the principal pathologic effect. The disease must be classified with the tumors (blastoses), because this form of disease must be considered among the spreading neoplasms which may be transmitted artificially from animal to animal. The transmissible agent is not an independent living organism but an enzyme-like production of the proliferating proerythrocytes.

SNAKEROOT AND RAYLESS GOLDENROD POISONOUS

Trembles, a disease of livestock, is caused by animals eating either of two weeds, white snakeroot or rayless goldenrod. The ailment is also known as milk sickness. White snakeroot is found widely distributed in the eastern United States and as far west as Minnesota, Nebraska, Oklahoma, and Louisiana. It grows most abundantly in the rich soil of damp woods. Rayless goldenrod, or jimmy weed, occurs in western Texas, New Mexico, and Arizona. The ailment resulting from eating this plant is known locally as alkali disease; the symptoms are identical with those produced by eating white snakeroot.

The poisonous substance in both plants is known as tremetol. The disease is so named because the affected animals often develop severe trembling, which is one of the distinguishing symptoms. Young animals or persons that drink milk from affected animals may also develop trembles.

There are no effective cures for animals affected with trembles, but the use of laxatives or purgatives, such as Epsom salt or raw linseed oil, often give relief. The animals should be given feeds of a laxative character.

Trembles may be prevented by fencing off areas in which either of the plants is abundant. Clearing land and seeding it to pasture or cultivated crops will eliminate the plants, but partial clearing is not considered sufficient. Although rayless goldenrod grows with great luxuriance in some places, the weed may be removed from ranges by digging out the roots to a depth of two or three inches.

Neither the rayless goldenrod nor white snakeroot are sought by animals, but are eaten only when desirable food is lacking, usually in the fall. Cases of poisoning usually occur when pastures are overgrazed or when animals are confined in places where the poisonous plants are especially abundant.